

## RESTORE Council FPL 3 Proposal Document

### **General Information**

*Proposal Sponsor:*

Mississippi Department of Environmental Quality

*Title:*

Water Quality Improvement Program for Coastal Mississippi Waters

*Project Abstract:*

Mississippi, through the Mississippi Department of Environmental Quality (MDEQ), is requesting \$40M in Council-Selected Restoration Component funding for the proposed Water Quality Improvement Program for Coastal Mississippi Waters. This would include \$8M in planning funds as FPL Category 1, as well as a separate \$32M implementation component as an FPL Category 2 priority for potential funding. This program would support the primary RESTORE Comprehensive Plan goal to restore water quality and quantity in the Mississippi Gulf Coast Region through the identification and implementation of water quality improvement projects. Program activities include planning, engineering and design, septic-to-sewer conversion, implementation of new stormwater and wastewater systems, and repairing/upgrading existing stormwater and wastewater systems. This program would be coordinated with water quality improvement efforts under other funding streams to maximize outcomes.

Causes of water quality degradation in coastal systems include nutrient pollution and associated hypoxia and also bacteriological sources. Water quality degradation is often attributed to urban runoff, discharge, and overflow issues associated with aging or insufficient wastewater management. The conversion of septic-to-sewer and implementation of stormwater and wastewater improvement practices under the proposed program is anticipated to reduce non-point source pollutant loads to downstream coastal receiving water bodies, resulting in an improvement in water quality of coastal waters and benefits to living coastal marine resources. Program duration is 10 years.

*FPL Category:* Cat1: Planning/ Cat2: Implementation

*Activity Type:* Program

*Program:* Water Quality Improvement Program for Coastal Mississippi Waters

*Co-sponsoring Agency(ies):* N/A

*Is this a construction project?:*

Yes

*RESTORE Act Priority Criteria:*

(I) Projects that are projected to make the greatest contribution to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region, without regard to geographic location within the Gulf Coast region.

(II) Large-scale projects and programs that are projected to substantially contribute to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast ecosystem.

(III) Projects contained in existing Gulf Coast State comprehensive plans for the restoration and

protection of natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region.

(IV) Projects that restore long-term resiliency of the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands most impacted by the Deepwater Horizon oil spill.

*Priority Criteria Justification:*

Coastal water quality issues are of great concern to the State and have been identified as a Gulf-wide priority. By addressing water quality degradation, this proposed program will make the greatest contribution to restoring and protecting coastal resources. Given the interest across multiple states, it is a large-scale contribution to a pervasive Gulf-wide problem. Water Quality has been identified as a priority in multiple plans:

- The Mississippi Gulf Coast Ecosystem Restoration Plan identifies water resources as a priority program (MDEQ 2015).
- The Gulf Coast Ecosystem Restoration Task Force (GCERTF 2011) identified restoration of water quality as one of four main restoration goals, with reduction of pollutants and pathogens from storm water flows listed as a major action under that goal.
- The Ocean Conservancy (OC 2011) identified reduction of land-based pollutants as important to marine resources.
- The National Wildlife Federation (NWF 2014) discusses the importance of water quality near-shore for a host of habitats and species.
- Mississippi Comprehensive Wildlife Conservation Strategy (Knight and Barber, 2005) highlights stormwater runoff as a threat to habitats associated with developed areas that should be managed.

By mitigating water quality degradation issues, the State is investing in a program that will contribute to the long-term resilience of the State's resources, specifically multiple living coastal marine resources. Reducing the likelihood of hypoxia and excessive nutrient loading, enhances the resilience of resources that are directly tied to MS and other Gulf state economies.

*Project Duration (in years):* 10

## **Goals**

*Primary Comprehensive Plan Goal:*

Restore Water Quality and Quantity

*Primary Comprehensive Plan Objective:*

Restore, Improve, and Protect Water Resources

*Secondary Comprehensive Plan Objectives:*

N/A

*Secondary Comprehensive Plan Goals:*

N/A

*PF Restoration Technique(s):*

Reduce excess nutrients and other pollutants to watersheds: Erosion and sediment control

Reduce excess nutrients and other pollutants to watersheds: Stormwater management

Reduce excess nutrients and other pollutants to watersheds: Wastewater system improvements

## **Location**

### *Location:*

Coastal Zone of Mississippi, which impacts the coastal waters of the State of Mississippi including bays, estuaries, streams, and the Mississippi Sound.

### *HUC8 Watershed(s):*

South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Pascagoula)  
South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Black)  
South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Escatawpa)  
South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Mississippi Coastal)  
South Atlantic-Gulf Region(Pearl) - Pearl(Lower Pearl)

### *State(s):*

Mississippi

### *County/Parish(es):*

MS - Hancock  
MS - Harrison  
MS - Jackson

### *Congressional District(s):*

MS - 4

## **Narratives**

### *Introduction and Overview:*

#### General Description of Activity:

The Water Quality Improvement Program (WQIP) will support the restoration of water quality of Mississippi's coastal water resources through the identification and implementation of water quality improvement projects. Improvement projects may include, but are not limited to, the conversion from septic-to-sewer, the construction of new stormwater and wastewater systems, and the repairing and/or upgrading of existing stormwater and wastewater systems that would result in the improvement of water quality and the restoration and protection of natural resources. Implementation may also include, but is not limited to, engineering, design, and permitting, MDEQ and/or eligible sub-recipients (e.g., municipalities, counties, utility authorities) may implement components of individual projects within the program.

#### Primary Goal and Objective:

The Gulf Coast Ecosystem Restoration Council's (RESTORE Council) 2016 Comprehensive Plan Update outlines five goals to provide an overarching framework for integrated and coordinated restoration approach to region-wide Gulf Coast Restoration. The primary goal addressed by the WQIP is Restore Water Quality and Quantity. The Mississippi WQIP would improve water quality within Mississippi coastal waters, including priority bays and estuaries, coastal rivers and streams, along Mississippi coastal beachfronts, and within the Mississippi Sound. The activities of the WQIP are consistent with RESTORE Council's primary objective of Restore, Improve, and Protect Water

Resources and targets projects that reduce and treat nutrient and pollutant loading.

Commitments in 2016 Comprehensive Plan Update:

The following describes how the WQIP addresses the commitments set forth in the 2016 Comprehensive Plan Update:

- **Regional ecosystem-based approach to restoration:** Water quality is a pervasive environmental concern across the Gulf Coast and is a priority goal for the RESTORE Council members. This regional approach is highlighted by the collaborative and connected multi-member interests in water quality improvement and commitment to addressing foundational issues causing water quality degradation. The State of Mississippi is addressing water quality improvement across the Mississippi Gulf Coast by identifying and implementing projects to mitigate downstream water quality degradation concerns. Addressing water quality provides resiliency to multiple living coastal marine resources within Mississippi and across the Gulf.
- **Leveraging resources and partnerships:** The State of Mississippi understands how leveraging is critical for effective coastal restoration. The State of Mississippi is investing in water quality improvement projects across the Deepwater Horizon (DWH) funding streams, including the following: Natural Resource Damage Assessment (NRDA) Nutrient Reduction projects in conjunction with USDA and EPA; habitat restoration efforts under National Fish and Wildlife Foundation Gulf Environmental Benefit Fund (NFWF-GEBCF); and similar water quality improvement programs under the Direct and Oil Spill Impact Components of the RESTORE Act. The State of Mississippi has collaborated with other Gulf State Council members regarding their water quality goals to develop this region-wide water quality improvement program.
- **Engagement, Inclusion, and Transparency:** The State of Mississippi's prioritization of the WQIP is based on multiple public and stakeholder engagement activities, including the Annual Mississippi Restoration Summit, the Mississippi Coastal Restoration Plan (NFWF-GEBCF) and the RESTORE Council's public engagement for the FPL3 Planning Framework. Throughout Mississippi's restoration public engagement and planning efforts, stakeholders have consistently identified the restoration and protection of water quality as a top priority.
- **Science-based decision-making:** Monitoring, source tracking, and other science-based decision tools will be utilized to determine the cause of water quality degradation, identify sources, and determine the effectiveness of implementation activities.
- **Delivering results and measuring impacts:** The WQIP will measure impacts of implementation through activities such as baseline monitoring, source tracking, and project and program specific monitoring. Monitoring activities for individual projects implemented will occur at the program level.

**General Description of Environmental Benefits:** Consistent with the RESTORE Council's water quality restoration goal, the State of Mississippi has prioritized the improvement of water quality for promoting ecosystem health and restoring and revitalizing Mississippi's economy. The conversion of septic-to-sewer (Kelly, 2019) and the implementation of stormwater and wastewater system improvement practices (Reisinger, et al., 2018) is anticipated to reduce non-point source pollutant loads to downstream coastal receiving water bodies. This will result in an improvement in water quality of coastal waters and would provide in-situ benefits to living coastal marine resources, as well as the economy of the Mississippi Gulf Coast.

**Environmental Stressors being addressed:** Water quality impairment in coastal systems is a global phenomenon (Bennett et al., 2001; Vörösmarty et al., 2010) that is not only limited to nutrient pollution and associated hypoxia, but also tied with bacteriological impairment (Mallin et al., 2000). Stressors in coastal Mississippi are discussed here.

**Pollutant Loading:** Bacterial loading from pollutant sources results in beach advisories and oyster

reef closures (with indirect consequences on coastal workforce and economies) (Feng et al., 2016). Nutrient loadings result in hypoxia development (Moshogianis et al., 2013) resulting in increased mortality of multiple living coastal and marine resources, both sedentary and mobile species. As a result of hypoxia, there is an additional possibility of harmful algal blooms occurring, posing both acute and chronic human health risks.

**Freshwater Inputs:** There are numerous freshwater inputs into Mississippi's bays, estuaries, and the Mississippi Sound, including inputs from urban systems, that result in alterations to water quality. This change in water quality is often associated with changes in water column conditions (i.e., hypoxia, eutrophication, and bacterial loads), and can also lead to the body of water not meeting its intended use (i.e., recreation or fishery) (Mallin et al., 2000; Pennington and Cech, 2010; Spellman, 2010).

**Urban runoff:** A significant amount of water quality impairment is attributed to urban runoff, discharge, and overflow issues associated with wastewater management (Dey and Truax, 2012). This is evidenced by direct contact advisories/closures, beach advisories/closures, as well as associations with storm events.

**Additional Corollary Factors:** Corollary factors that are likely contributors to the overall water quality dynamics on the coast that require consideration include source tracking of fecal coliform loads derivations, sediment load variability, and seasonal influences on bacterial levels.

**Total Cost:** \$40,000,000. Water quality implementation is scalable.

**Timeline:** 10 years

**Partners:** The State of Mississippi will coordinate with coastal municipalities, counties and utility authorities to implement projects under the WQIP.

**Alignment with FPL3 Planning Framework:** The WQIP proposal aligns with the planning framework approach to reduce excess nutrients and other pollutants to watersheds and downstream receiving waters. Planning framework techniques that are anticipated to be utilized include storm-water management, erosion and sediment control, and wastewater system improvements.

### *Proposed Methods :*

This WQIP would support the restoration and protection of natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast Region (GoCoast, 2013; GCERC, 2016). Program activities may run concurrently and include project planning and selection, engineering and design (E&D), permitting, conversion from septic to sewer in coastal communities, and implementation of new and/or repairing and upgrading existing stormwater and wastewater systems. Additionally, this program will be coordinated with other water quality improvement efforts under other Deepwater Horizon related funding streams, including water quality activities funded under the Direct and Oil Spill Components of the RESTORE Act.

The scope of work for this specific proposal can be generally classified into four components:

1. Program management and Oversight

Program management and oversight will cover general activities associated with this program and projects funded under this program. MDEQ personnel and its contractors will provide administrative programmatic functions and/or support during the life of the grant. MDEQ, with contractual support, will also manage the data associated with this program in accordance with the procedures outlined in the Observational Data Plan and the Data Management Plan.

## 2. Project Planning and Selection

This section provides context for how the State of Mississippi anticipates selecting projects to implement within the Council–Selected Restoration Component of the WQIP. Projects may be identified through existing data and analysis that demonstrate connectivity to water quality impairments, as well as, through the source tracking process where data gaps exist. Also, MDEQ may coordinate with local city and county entities to support identification of known wastewater/stormwater system failures contributing to water quality degradation. When needed, systematic source tracking may be utilized to identify sources and stressors of water quality degradation. Source tracking uses the identified water quality impairments (e.g., beach/advisory information, etc.) to establish hotspot specific water quality sampling regimes in order to systematically work upstream to identify the source of the degradation. Source tracking activities may include water quality sampling, tracking of pollutants, flow monitoring, stormwater and wastewater system testing, microbial source tracking, and could also include the sampling of marine nearshore sediments to provide an initial assessment of pollutant loading in the system. The source tracking process provides the analytical guidance and outlines the next steps for project identification, when needed. The source tracking process would determine hot spots for bacterial concentrations moving along an upstream gradient. Tributary contributions may be evaluated by examining the respective contributions, including potential concentrations and loads. Water sample analysis may be utilized to refine specific project and/or the source contamination project areas. Once an area or a specific project has been identified, additional due diligence (i.e., smoke testing, dye testing, and/or camera inspection), project scoping and coordination may be undertaken. Due diligence for individual projects would be unique and require varying degrees of additional work and may include cost benefit analyses, economic feasibility, preliminary engineering, environmental compliance and additional pre-construction activities.

## 3. Engineering and design, permitting, and implementation

Implementation may include, but is not limited to, engineering and design, permitting, small and large scale septic-to-sewer conversions, and any needed repairs, upgrades, or new construction of stormwater and wastewater management systems. MDEQ and/or eligible sub-recipients may implement components of individual projects within the program. Engineering, design, and permitting would be conducted in accordance with the applicable engineering and design guidelines and standards. For each project selected for implementation, specific workplans (including, but not limited to, budget and budget narrative, project narrative, milestones, environmental compliance, updates to the program ODP/DMP, and GIS files) would be provided to the RESTORE Council with updated project level information to facilitate the release of appropriate funds.

## 4. Post Implementation Monitoring

Monitoring would follow milestones as described in the individual project workplans, as well as additional monitoring measures within the Program. Monitoring could include as built defined dimensions, lengths, surveys describing construction activities, as well as other construction related milestones. From a water quality monitoring perspective, all sampling collection, handling, transportation and analyses would occur according to state and federal QA/QC guidelines. Monitoring requirements will be unique for each project. Pre-implementation, baseline sampling, determination of pollutant of concern, and sampling design of post construction monitoring would be considered in developing a monitoring plan. While the project identification and evaluation process is linear, it is likely that there will be multiple processes occurring simultaneously across coastal Mississippi (e.g., one project in E&D phase, while another project is in post-construction monitoring phase). Water quality core parameter guidance will be project specific, but would reference any available RESTORE and NRDA related monitoring guidance.

### *Environmental Benefits:*

Elevated levels of potentially harmful bacteria are one of several water quality problems that exist on the Mississippi Gulf Coast (MDEQ online information). Bacterial impairment can come from a variety of nearshore and inland sources including storm-water runoff, boating waste, sewer overflows, septic system failures, wildlife, and other human activities. Nationwide, failure rates for septic systems vary, but the regional rate of septic failure is reported to range between 5% and 40%, with an average of about 10% (Swann 2008). Maryland and Virginia have reported failure rates of 5% for their septic systems (Fehr and Pae, 1997). Iverson (2019) documented statistically significantly higher nutrient exports from watersheds with high density of septic systems (approx. 1.8 systems / ha). Mass exports of total dissolved nitrogen and phosphate from high density watersheds were approximately 5 to 10 times higher than control and low density watersheds.

Septic systems by their very design are intended to leak sewage (Harrison et al., 2012). Converting septic to sewer is a major component of dealing with water pollution issues. Septic to sewer conversion in coastal watersheds are critical to avoid hydraulic and treatment failures as well as subsurface plumes that are typical of septic system failures. Multiple studies demonstrate hydraulic failures as well as subsurface plumes of dissolved nitrogen and phosphorus which have direct impacts to downstream water bodies (Gilliom and Patmont, 1983; Carodona, 1998). A study in Indiana suggested that one in three septic systems between 1950 and 2001 required repairs; however, since 1990 less than 3% of new septic systems required repairs, significantly fewer than in previous decades (Stout, 2003). However, in environments where soil wetness, high water tables, and frequent storm events are common occurrences, septic system failure, regardless of installation time frame, increases (Kohler et al., 2020).

Restoration and improvement of the quality of water as a natural resource will benefit the marine/coastal ecosystems, habitats, and fisheries, and provide economic benefits to the Mississippi Gulf Coast Region. Water quality degradation in coastal systems is a global phenomenon (Bennett et al., 2001; Vörösmarty et al., 2010; Lymer et al., 2018) and includes nutrient pollution and associated hypoxia (Diaz and Rosenberg, 2008) as well as enhanced bacteriological concentrations and loads (Mallin et al., 2000; O'Mullan et al., 2019). There are numerous freshwater inputs into Mississippi's bays, estuaries, and the Mississippi Sound, that result in alterations to water quality (Mickle et al., 2018). This change in water quality is often associated with changes in water column conditions (i.e., hypoxia, eutrophication, and bacterial loads) and can lead to the body of water not meeting its intended use classification (i.e., recreation or warm water fishery) (Mallin et al., 2000; Pennington and Cech, 2010; Spellman, 2010). Wastewater management is often the most visible contributor to water quality degradation and is often associated with urban runoff, as well as discharge and sanitary sewer overflow (SSOs). The EPA estimates that there are at least 23,000 – 75,000 SSOs per year in the U.S. (EPA, N.D.), many of which are not specifically associated with impaired water listings, TMDLs, or other criteria. Urban wastewater connects directly to coastal marshes and the Mississippi Sound through canals and bayous. There are numerous studies and governmental reports that point to SSOs impacting and contributing to decreases in water quality, beach closures, shellfish bed closures, and other environmental problems (EPA, 2004; MDEQ, n.d., online).

The following objectives are set forth to improve water quality entering the Mississippi Sound and coastal waters:

- Systematic water quality evaluation and assessment to identify the source, dynamics, and most cost effective stormwater and wastewater improvement practices to improve water quality (Park et al., 1994; Sharpley et al., 2007; Spellman, 2008).
- Engineering, design, and permitting of the identified solutions (standard engineering practices, including certified and sealed plans). Conventional gravity sewers, force mains, pumping

stations, treatment works, repair or construction, standard engineering principles or guidelines will vary depending on the system upgrade. Specific engineering guidelines would be informed by State agency policy decisions (MDEQ, n.d).

- Additional resources on new technologies tied to upgrades and improvements to wastewater collection systems (Sterling et al., 2010; FDEP, 2018) may be considered based on system circumstances, environmental and permitting regulations and restrictions.
- Implementation of designed stormwater and wastewater improvement practices. Implementation would follow standard construction and environmental practices, and any other applicable state and federal requirements (Walsh et al., 2005a, b; Hogan and Walbridge, 2007; Walsh et al., 2016).
- Monitoring of success of the respective practices (Kondolf and Micheli, 1995; Spellman, 2008; Lindenmayer and Likens, 2009a, 2009b; Reynolds et al., 2016). Specific wastewater discharges will be documented as project outcomes, as well as project-specific changes to downstream receiving waters (Fu et al., 2019; Tolouei et al., 2019).

#### *Metrics:*

Metric Title: HM001 : Nutrient reduction - Lbs. N avoided or removed

Target: 0

Narrative: Target is currently TBD. This is being proposed as a project or activity specific metric. The purpose of this metric would be to verify that a reduction or avoidance of N loading had been completed, and the performance measure would be the project or activity's ability to avoid or reduce lbs. of N. Once a project or activity is selected a target value will be established.

Metric Title: HM003 : Nutrient reduction - Lbs. P avoided or removed

Target: 0

Narrative: Target is currently TBD. This is being proposed as a project or activity specific metric. The purpose of this metric would be to verify that a reduction or avoidance of P loading had been completed, and the performance measure would be the project or activity's ability to avoid or reduce lbs. of P. Once a project or activity is selected a target value will be established.

Metric Title: HM004 : Sediment reduction - Lbs. sediment avoided or removed

Target: 0

Narrative: Target is currently TBD. This is being proposed as a project or activity specific metric. The purpose of this metric would be to verify that a reduction or avoidance of sediment loading had been completed, and the performance measure would be the project or activity's ability to avoid or reduce lbs. of sediment loading. Once a project or activity is selected a target value will be established.

Metric Title: RES002 : Watershed management - # upgrades to stormwater and/or wastewater systems

Target: 1

Narrative: This is being proposed as a program specific metric. The number of upgrades to stormwater and/or wastewater systems for water quality implementation project.

Metric Title: PRM011 : Restoration planning/design/permitting - # E&D plans developed

Target: 2



Narrative: This is being proposed as a program specific metric. The number of E&D plans for water quality projects.

Metric Title: PRM013 : Restoration planning/design/permitting - # environmental compliance documents completed

Target: 2

Narrative: This is being proposed as a program specific metric. The number of permits/compliance documents for water quality implementation project.

*Risk and Uncertainties:*

Uncertainties could lie in inadequate planning to achieve desired water quality improvements as a result of the repair, upgrade, and/or construction that is implemented. Further uncertainty lies in the exact water quality improvement practice that needs to be implemented, the extent of the practice, as well as the utilization of multiple practices. This uncertainty results in a highly variable cost for implementation. By undertaking due diligence on source tracking and narrowing in, through water quality monitoring and beach advisory information to the area of concern, the risk associated with not seeing measurable improvements in water quality as a result of implementation are mitigated. Furthermore, through specific tasks and objectives for planning and evaluation, uncertainty in the scientific basis for implementation is reduced, as well as, the types of practices to be implemented and their respective costs. MDEQ has significant experience in implementing water quality improvement projects across the State of Mississippi, with a particular emphasis on the Mississippi Gulf Coast. MDEQ managed and provided oversight to the Community Development Block Grant (CDBG) program that invested over \$600 million in drinking water and wastewater improvement projects in the Mississippi coastal counties affected by Hurricane Katrina. An identified risk of implementation of best management practices for water quality improvement in riparian and in-stream areas is the effect on water flow, specifically causing flooding and drainage issues to upstream urban areas. Specific engineering and design of wastewater/stormwater improvement practices will evaluate the risk for said practices to influence and control water flow and ensure that design maximizes water quality mitigation. With diligent and effective planning prior to implementation, as well as post construction monitoring, uncertainties and risks of not improving water quality moving into the Mississippi Sound are significantly decreased. Sea level rise and storm surge are two risks and uncertainties to project implementation performance. Given the variability in sea level rise prediction as well as the anticipated immediate ecosystem service benefits of the implementation of sewer and wastewater infrastructure, is unlikely that pipe infrastructure implementation will consider sea-level rise. Hummel et al. (2018) summarized a national assessment of coastal wastewater treatment facilities at risk for sea level rise. Mississippi was classified as low risk, with low exposure across a sea level rise gradient from 1ft to 6ft. However, with respect to storm surge, certain upgrades (i.e., pump stations, backflow valves, electrical connections etc.) could be based on storm surge predictions and to ensure lack of failure under those conditions.

*Monitoring and Adaptive Management:*

Monitoring would follow milestones as described in the individual project workplans, as well as additional monitoring measures within the Program. Monitoring could include as built defined dimensions, lengths, surveys describing construction activities, as well as other construction related milestones. From a water quality monitoring perspective, implemented projects will be monitored for their effectiveness in improving water quality in the respective identified water resource degradation, as applicable. For all impairments, trends over time could be compared to long-term advisory information to document changes. These trends could also be closely paired with environmental conditions of water flow and climate to highlight and provide reasoning for any documented changes. Additional monitoring and evaluation criteria could include: modeling estimates for changes in infiltration and inflow, pressure gauge and/or smoke testing, pollutant monthly and stormwater event sampling, and flow. Regardless of the criteria, pre/post

implementation methodologies will inform the identification of project changes to water quality. Post implementation monitoring will identify project specific outcomes. If monitoring does not show progress towards those outcomes, additional vetting of project implementation success, and/or the identification of additional problem areas may occur to further improve water quality success criteria.

Water quality improvement projects implemented through this program may be operated and maintained by either MDEQ or eligible sub-recipient(s) both during and after the period of performance. Operation and maintenance activities necessary beyond the scope of work for this program are anticipated to be funded by local funding sources.

#### *Data Management:*

MDEQ will store and manage an ISO-compliant relational database and geospatial database on a server that utilizes the Amazon Web Services cloud-based server environment. In addition to the network and server administration provided by Amazon Web Services, MDEQ manages the server, operating system, software and services. GIS information is backed up in three locations. The data is included in server snapshots performed by and stored at Amazon Web Services. Duplicate datasets are also located on a secure, cloud-based system. This system includes separate cloud backup and storage on two separate network attached storage arrays located in Gulfport and Jackson, MS. Finally, copies of the data are stored on an internal server. All electronic data and metadata will be delivered to the RESTORE Council on a yearly basis for review and approval.

#### *Collaboration:*

The State of Mississippi, through Comprehensive Plan Commitment and Planning Support activities, has collaborated with Gulf state Council members to identify, develop and refine this region-wide water quality improvement request. To advance the proposed program, MDEQ will collaborate with local municipalities, counties, utility authorities and other relevant agencies to identify and mitigate sources (e.g. infrastructure system failures) contributing to water quality impairments.

#### *Public Engagement, Outreach, and Education:*

The State of Mississippi's prioritization of the WQIP for Coastal Mississippi Waters is based on multiple public and stakeholder engagement activities. Throughout Mississippi's restoration public engagement and planning efforts, stakeholders have consistently identified the restoration and protection of water quality as a top priority. The following are examples of public engagement, outreach and education activities which were considered in the selection of this proposal:

Annual Mississippi Restoration Summit: MDEQ has hosted the Mississippi Restoration Summit annually for four consecutive years. The public is invited to learn about restoration projects and programs and to provide input on current and future priorities for restoration. The priority of water quality has been highlighted each year and MDEQ's ongoing water quality improvement program planning and implementation efforts were the central theme of the 2019 Summit. Based on the input received at the annual summits, investing in water quality restoration and protection continues to be a top priority of stakeholders.

Mississippi Coastal Restoration Plan (NFWF-GEBCF): In 2014, MDEQ undertook a multi-year planning effort to develop a comprehensive plan to support NFWF-GEBCF restoration program activities in Mississippi. Development of the Mississippi Coastal Restoration Plan included extensive engagement with the public, NGO's/subject matter experts and state and federal agencies. MDEQ's community engagement activities included community conversation and resource summits held in each of the three coastal counties. The community conversation meetings had more than 200 participants, representing 125 organizations, across the three coastal county locations. The importance of water

quality restoration and enhancement was a top common value voiced across all three coastal counties.

RESTORE Act Mississippi State Expenditure Plan: Since 2016, MDEQ has solicited stakeholder input to support planning and development of the Mississippi State Expenditure Plan (MSEP). Engagement with a wide range of stakeholders, including private citizens, non-governmental organizations, business owners, elected officials, and other community leaders, has informed the priorities for restoration. During the 2019 MSEP planning and development, MDEQ received input from stakeholders that reaffirmed the priorities of water quality, restoring and revitalizing the economy, and community resilience.

*Leveraging:*

Funds: \$5,000,000.00

Type: Bldg on Others

Status: Received

Source Type: Other Federal

Description: Coastal streams and watersheds have been impacted by urban development, hydrologic alterations, erosion, invasive species and other factors that have led to a decrease in water quality discharging into the Mississippi Sound. The purpose of the Strategic Stream Restoration Program is to implement coastal stream restoration strategies in the three Mississippi coastal counties to improve water quality entering the Mississippi Sound, as well as increase ecosystem function of the streams.

Funds: \$11,000,000.00

Type: Bldg on Others

Status: Received

Source Type: Other Federal

Description: This Mississippi Gulf Coast Water Quality Improvement Program grant supports the restoration and protection of natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Mississippi Gulf Coast Region through the identification and implementation of water quality improvement projects. Improvement projects may include, but are not limited to, the construction of new or the repairing/upgrading of existing stormwater and wastewater systems, including conveyance and treatment, to mitigate water quality issues in a coastal water resource.

Funds: \$49,000,000.00

Type: Bldg on Others

Status: Received

Source Type: Other Federal

Description: This Mississippi Gulf Coast Water Quality Improvement Program grant supports the restoration of water quality of Mississippi's coastal water resources by targeting stormwater sources, discharges, and/or wastewater improvements that will result in the improvement of water quality and the restoration and protection of natural resources. Efforts to achieve such improvements include enhancing the State's understanding of source water quality problems, implementing upgrades, repairs, and/or construction activities associated with stormwater and wastewater systems to restore water quality and promote ecosystem health.

Funds: \$3,600,000.00

Type: Bldg on Others

Status: Received

Source Type: Other

Description: The Coastal Streams and Habitat Initiative was funded by NFWF-GEBF. The Coastal Stream and Habitat Restoration and Management Initiative created strategies and restoration designs to abate threats to priority coastal streams and restore associated habitat.

Funds: \$500,000.00

Type: Bldg on Others

Status: Received

Source Type: Other

Description: The Design Challenge for Improvement of Water Quality from Beach Outfalls was funded by NFWF-GEBF to encourage individuals and teams to compete to create innovative “green” solutions to address the water quality impacts of beach outfalls. This project funded a design competition to find innovative eco-solutions for water quality impairments associated with beach outfalls in Mississippi.

Funds: \$4,000,000.00

Type: Bldg on Others

Status: Received

Source Type: Other

Description: The Upper Pascagoula River Water Quality Enhancement project includes development and implementation of conservation plans to reduce nutrient and sediment contributions in the watershed. The project includes an extensive outreach program to land owners. Conservation practices will be planned and implemented on property throughout the watershed with emphasis given to properties bordering rivers and streams.

#### *Environmental Compliance:*

Environmental compliance documentation will be updated. Similar to project specific implementation information, environmental compliance checklists and required environmental compliance information will be provided on individual projects as identified. All specific environmental compliance needs will be identified during project identification and development activities.

#### *Bibliography:*

Alabama Soil and Water Conservation Committee. 2018. Alabama handbook for erosion control, sediment control, and stormwater management on construction sites and urban areas: Volume 1 – developing plans and designing best management practices. Available online: <https://www.dot.state.al.us/dsweb/divped/Stormwater/pdf/AlabamaHandbookforErosionControl.pdf>  
Last accessed: 3.23.2020

Bennett, E.M. Carpenter, S.R., Caraco, N.F. 2001. Human impact on erodible phosphorus and eutrophication: a global perspective. Bioscience 51(3), 227-234

Carodona, M. 1998. Nutrient and Pathogen Contributions to Surface and Subsurface Waters From On-site Wastewater Systems - A Review. North Carolina State University Cooperative Extension Service

Dey, A., and D.D. Truax. 2012. Evaluation of On-site Wastewater Disposal Systems in Mississippi Coastal Areas. Water Air Soil Pollution, 223, 2145–2156

Diaz, R.J., Rosenberg, R. 2008. Spreading dead zones and consequences for marine ecosystems. *Science*, 321, 626-929

EPA (no date). The Environmental Protection Agency – National Pollutant Discharge Elimination System (NPDES) – Sanitary Sewer Overflows (SSOs). Available online: <https://www.epa.gov/npdes/sanitary-sewer-overflows-ssos> Last accessed: 4.2.2020

EPA (2004). Report to Congress on Impacts and Control of Combined Sewer Overflows and Sanitary Sewer Overflows. Environmental Protection Agency. Available online: [https://www.epa.gov/sites/production/files/2015-10/documents/csosortc2004\\_full.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/csosortc2004_full.pdf) Last Accessed: 4.2.2020

FDEP (2018). Restoring Bacteria-Impaired Waters: A toolkit to help local stakeholders identify and eliminate potential pathogen problems. Version 3.0. 63 pg. Available online: [https://floridadep.gov/sites/default/files/Restoring\\_Bacteria-Impaired\\_Waters\\_Toolkit\\_082018.pdf](https://floridadep.gov/sites/default/files/Restoring_Bacteria-Impaired_Waters_Toolkit_082018.pdf) Last Accessed: 4.2.2020

Fehr, Stephen and Peter Pae. 1997. "Aging Septic Tanks Worry D.C. Suburbs." *Washington Post*, May 18, 1997.

Feng, Z., A. Reniers, B. K. Haus, H. M. Solo-Gabriele, and E. A. Kelly. 2016. Wave energy level and geographic setting correlate with Florida beach water quality. *Marine Pollution Bulletin* 104, 54-60.

Fu, X., Goddard, H., Wang, X., Hopton, M.E. 2019. Development of a scenario-based stormwater management planning support system for reducing combined sewer overflows (CSOs). *Journal of Environmental Management*, 236, 571-580

GCERC, 2016. Comprehensive Plan Update 2016. Restoring the Gulf Coast's ecosystem and the economy. Gulf Coast Ecosystem Restoration Council, New Orleans, Louisiana.

GCERTF (Gulf Coast Ecosystem Restoration Task Force). 2011. Gulf of Mexico regional ecosystem restoration strategy. *Gulf Coast Ecosystem Restoration Task Force*, pp.128

Georgia Department of Natural Resources. 2001. Georgia Stormwater Management Manual. Available online: <http://www.lex-co.com/Departments/PublicWorks/GSMMVol2.pdf> Last accessed: 3.25.2020

GoCoast 2013. GoCoast 2020 Final Report. GoCoast 2020 Commission, Final Plan Issued January, 2013.

Gilliom, R.J. and C. Patmont. 1983. "Lake Phosphorus Loading from Septic Systems by Seasonally Perched Groundwater." *Journal of the Water Pollution Control Federation* 55 (10), 1297-1305.

Griffith, J.F., B.A. Layton, A.B. Boehm, P.A. Holden, J.A. Jay, C. Hagedorn, C.D. McGee, and S.B. Weisburg. 2013. The California microbial source identification manual: a tiered approach to identifying fecal pollution sources to beaches. Technical Report 804, Southern California Coastal Water Research Project (SCCWRP).

Harrison M., Stanwyck, E., Beckingham, B., Starry, O., Hanlon, B., Newcomer, J. 2012. Smart growth and the septic tank: wastewater treatment and growth management in the Baltimore region. *Land Use Policy* 29 (3), 483-492

Hogan, D.M., Walbridge, M.R. 2007. Best management practices for nutrient and sediment retention in urban stormwater runoff. *Journal of Environmental Quality* 36, 386-395

Hummel, M.A., Berry, M.S., Stacey, M.T. 2018. Sea level impacts on wastewater treatment systems

along the US coasts. *Earth's Future* 6 (4), 622-633.

Iverson, G. 2019. Nutrient contributions from septic systems in nutrient-sensitive watersheds: quantifying nutrient inputs, reductions methods, and economic feasibility. Doctoral Dissertation, East Carolina University. Available online: <https://thescholarship.ecu.edu/handle/10342/7220> Last accessed: 3.23.2020.

Kelly, E.A. 2019. Developing water quality policies: assessing natural environmental characteristics and anthropogenic impact on microbiological water quality at recreational beaches. University of Miami, Ph.D. dissertation, Department of Ecosystem Science and Policy. Available online: [https://scholarlyrepository.miami.edu/oa\\_dissertations/2279/](https://scholarlyrepository.miami.edu/oa_dissertations/2279/) Last accessed: 4.4.2020.

Kohler, L.E., Silverstein, J., Rajagopalan, B. 2020. Resilience of on-site wastewater treatment systems after extreme storm event. *Journal of Sustainable Water in the Built Environment* 6(2), <https://doi.org/10.1061/JSWBAY.0000909>

Kondolf, G.M., Micheli, E.R. 1995. Evaluating stream restoration projects. *Environmental Management* 19(1), 1-15

Knight, C., Barber, E. 2005. Mississippi Comprehensive Wildlife Conservation Strategy 2005-2015 Version 1.1 *Mississippi Department of Wildlife, Fisheries and Parks on behalf of the State of Mississippi*, pp.428

Lindenmayer, D.B., Likens, G.E. 2009a. Improving ecological monitoring. *Trends in Ecology and Evolution* 24, 200-201.

Lindenmayer, D.B., Likens, G.E. 2009b. Adaptive monitoring: a new paradigm for long-term research and monitoring. *Trends in Ecology and Evolution* 24, 482-486.

Lymer, B.L., Weinberg, J., Clausen, T.J. 2018. Water quality management from source to sea: from global commitments to coordinated implementation. *Water International* 43(3), 349-360

Mallin, M.A., Williams, K.E., Esham, E.C., Lowe, R.P. 2000. Effect of human development on bacteriological water quality in coastal watersheds. *Ecological Applications* 10(4), 1047-1056

Mississippi Department of Environmental Quality (MDEQ) (no date/variable dates). Guidance for the design of publicly owned wastewater facilities, Mississippi Department of Environmental Quality. Available online: <https://www.mdeq.ms.gov/about-mdeq/grants-loans-and-trust-funds-available-through-mdeq/guidance-for-the-design-of-publicly-owned-wastewater-facilities/> Last Accessed: 4.4.2020

MDEQ – Online Information. Mississippi Beach Monitoring Program. <https://opcgis.deq.state.ms.us/beaches/closures.php> Last accessed: 6.3.2020

MDEQ 2011. Mississippi handbook for erosion control, sediment control and stormwater management on construction sites and urbane areas. Available online: [https://www.mdeq.ms.gov/wp-content/uploads/2017/05/Volume\\_1-1.pdf](https://www.mdeq.ms.gov/wp-content/uploads/2017/05/Volume_1-1.pdf) Last accessed: 3.27.2020.

MDEQ (Mississippi Department of Environmental Quality), 2015. *The Mississippi Gulf Coast Ecosystem Restoration Plan*. Available online: <http://www.restore.ms/nfwf-plans-and-reports/>  
Mickle, P.F., Herbig, J.L., Somerset, C.R., Chudzik, B.T., Lucas, K.L., Fleming, M.E. 2018. Effects of annual droughts on fish communities in Mississippi sound estuaries. *Estuaries and Coasts* 41(5), 1475-1485

Moshogianis, A., Lopez, J., Henkel, T., Boyd, E., Baker, A., Hillmann, E. 2013. Preliminary results of recently observed hypoxia development in the Chandeleur Sound and Breton Sound of Southeastern Louisiana, East of the Mississippi River Delta. Technical Report from the Lake Pontchartrain Basin Foundation; Available online: <https://www.landcan.org/pdfs/chandeleur-2013-hypoxia-july2013.pdf> Last accessed: 6.3.2020

NWF (National Wildlife Federation). 2014. Restoring the Gulf of Mexico for people and wildlife: recommended projects and priorities. Available online: [https://www.nwf.org/~media/PDFs/Water/2014/NWF\\_Embargo\\_Dec-9\\_11am\\_CT\\_Restoring-the-Gulf-Projects-and-Priorities.pdf](https://www.nwf.org/~media/PDFs/Water/2014/NWF_Embargo_Dec-9_11am_CT_Restoring-the-Gulf-Projects-and-Priorities.pdf)

OC (Ocean Conservancy). 2011. Restoring the Gulf of Mexico: A Framework for Ecosystem Restoration in the Gulf of Mexico. *The Ocean Conservancy*, pp.128

O'Mullan, G.D., Juhl, A R., Reichert, R., Schneider, E., Martinez, N. 2019. Patterns of sediment associated fecal indicator bacteria in an urban estuary: benthic-pelagic coupling and implications for shoreline water quality. *Science of the Total Environment* 656, 1168-1177

Park, S. W., Mostaghimi, S., Cooke, R.A., McClellan, P.W. 1994. BMP impacts on watershed runoff, sediment, and nutrient yields. *Water Resources Bulletin* 30,1011-1023.

Pennington, K. L., and T. V. Cech. 2010. Introduction to water resources and environmental issues. Cambridge University Press, Cambridge, UK.

Reisinger, A.J., Woytowitz, E., Majcher, E., Rosi, E.J., Belt, K.T., Duncan, J.M., Kaushal, S.S., Groffman, P.M. 2018. Changes in long-term water quality of Baltimore streams are associated with both gray and green infrastructure. *Limnology and Oceanography* 64 (S1), S60-S76

Reynolds, J.H., Knutson, M.G., Newman, K.B., Silverman, E.D., Thompson, W.L. 2016. A road map for designing and implementing a biological monitoring program. *Environmental Monitoring and Assessment* 188, 399-424

Sharpley, A. N., Krogstad, T., Kleinman, P.J.A, Haggard, B.E., Shigaki, F., Saporito, L.S. 2007. Managing natural processes in drainage ditches for nonpoint source phosphorus control. *Journal of Soil Water Conservation* 62,197-206.

Spellman, F.R. 2008. *The Science of Water: concepts and applications*. 2<sup>nd</sup> Edition. CRC Press, Taylor and Francis Group, New York, NY; Chp: 3 (pp.45-95), Chp: 8 (pp.219-287), Chp: 9 (pp.289-323), Chp: 10 (pp.325-399).

Spellman, F.R. 2010. *The Science of Environmental Pollution*. 2<sup>nd</sup> Edition. CRC Press, Taylor and Francis Group, New York, NY.

Sterling, R., Simicevic, J., Allouche, E., Condit, W., Wang, L. (2010). State of Technology for Rehabilitation of Wastewater Collection Systems. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-10/078, 2010. Available online: [https://cfpub.epa.gov/si/si\\_public\\_record\\_report.cfm?Lab=NRMRL&dirEntryId=226504](https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=226504). Last Accessed: 4.2.2020

Stout, H.M. 2003. Soils and Onsite Wastewater Treatment System Performance in Northern Indiana. Master's thesis, Purdue University, West Lafayette, IN.

Swann, C. 2008. The Influence of septic systems at the watershed level. *Urban Lake Management* 821- 834. Available online:

<http://saublesewer.devuna.com/Documents/20080523%20The%20influence%20of%20septic%20systems%20at%20the%20Watershed%20Level.pdf> Last accessed: 3.23.2020

Tolouei, S., Burnet, J.B., Auxtixier, L., Taghipour, M., Bonsteel, J., Vo, S., Sauve, S., Prevost, M., Dorner, S. 2019. Temporal variability of parasites, bacterial indicators, and wastewater micropollutants in a water resource recovery facility under various weather conditions. *Water Research* 148, 446-458

Vörösmarty, C.J., McIntyre, P.B., Gessner, M.O., Dudgeon, D., Prusevich, A., Green, P., Glidden, S., Bunn, S.E., Sullivan, C.A., Reidy Liermann, C. & Davies, P.M. 2010. Global threats to human water security and river biodiversity. *Nature*, vol. 467, no. 7315, pp. 555-561.

Walsh, C.J., Fletcher, T.D., Ladson, A.R. 2005a. Stream restoration in urban catchments through redesigning stormwater systems: looking to the catchment to save the stream. *Journal of the Northern American Benthological Society* 24(3), 690-705

Walsh, C.J., Roy, A.H., Feminella, J.W., Cottingham, P.D., Groffman, P.M., Morgan, R. P. 2005b. The urban stream syndrome: current knowledge and the search for a cure. *Journal of the Northern American Benthological Society* 24(3), 706-723.

Walsh, C.J., Booth, D.R., Burns, M.J. Fletcher, T.D., Hale, R.L., Hoang, L.N., Livingston, G., Rippy, M.A., Roy, A.H., Scoggins, M., Wallace, A. 2016. Principles for urban stormwater management to protect stream ecosystems. *Freshwater Science* 35(1), 398-411.



## **Budget**

### *Project Budget Narrative:*

A total of \$40,000,000 is being requested from FPL 3b to fund activities associated with the Program. The funds being requested are solely intended to be used for the planning, implementation, and monitoring of water quality related infrastructure improvement. An estimated 20% will be used for FPL Category 1 activities such as project planning (e.g., project selection and development), program and project administration (e.g., administrative programmatic functions, coordination, and sub-recipient / contractual support for project implementation), engineering and design, permitting, monitoring, adaptive management and data management activities. An estimated 80% will be for FPL Category 2 implementation (i.e., construction) of stormwater and wastewater management systems (including upgrades and repairs), as well as possible septic to sewer conversions. The need for contingency costs will be considered as appropriate when developing individual project-specific budgets.

### *Total FPL 3 Project/Program Budget Request:*

\$ 40,000,000.00

*Estimated Percent Monitoring and Adaptive Management: 5 %*

*Estimated Percent Planning: 13 %*

*Estimated Percent Implementation: 80 %*

*Estimated Percent Project Management: N/A*

*Estimated Percent Data Management: 2 %*

*Estimated Percent Contingency: N/A*

### *Is the Project Scalable?:*

Yes

### *If yes, provide a short description regarding scalability.:*

The extent of water quality improvements is scalable based on the number, extent, and size of projects implemented. Scaling of extent will scale the level of impact.

## **Environmental Compliance<sup>1</sup>**

| <b>Environmental Requirement</b>                                     | <b>Has the Requirement Been Addressed?</b> | <b>Compliance Notes<br/>(e.g., title and date of document, permit number, weblink etc.)</b>  |
|--|--|--|
| <b>National Environmental Policy Act</b>                             | Yes  | In Category 1, this proposed activity involves only planning actions. These planning actions are covered by the Council's NEPA Categorical Exclusion for planning, research or design activities (Section 4(d)(3) of the Council's NEPA Procedures). Additional NEPA compliance will be required for Category 2 efforts. |
| <b>Endangered Species Act</b>  | N/A  | Note not provided.   |
| <b>National Historic Preservation Act</b>                            | N/A  | Note not provided.   |
| <b>Magnuson-Stevens Act</b>  | N/A  | Note not provided.   |
| <b>Fish and Wildlife Conservation Act</b>                            | N/A  | Note not provided.   |
| <b>Coastal Zone Management Act</b>                                   | N/A  | Note not provided.   |
| <b>Coastal Barrier Resources Act</b>                                 | N/A  | Note not provided.   |
| <b>Farmland Protection Policy Act</b>                                | N/A  | Note not provided.   |
| <b>Clean Water Act (Section 404)</b>                                 | N/A  | Note not provided.   |
| <b>River and Harbors Act (Section 10)</b>                            | N/A  | Note not provided.   |
| <b>Marine Protection, Research and Sanctuaries Act</b>               | N/A  | Note not provided.   |
| <b>Marine Mammal Protection Act</b>                                  | N/A  | Note not provided.   |
| <b>National Marine Sanctuaries Act</b>                               | N/A  | Note not provided.   |
| <b>Migratory Bird Treaty Act</b>                                     | N/A  | Note not provided.   |
| <b>Bald and Golden Eagle Protection Act</b>                          | N/A  | Note not provided.   |
| <b>Clean Air Act</b>   | N/A  | Note not provided.   |
| <b>Other Applicable Environmental Compliance Laws or Regulations</b> | N/A  | Note not provided.   |

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<sup>1</sup> Environmental Compliance document uploads available by request ([restorecouncil@restorethegulf.gov](mailto:restorecouncil@restorethegulf.gov)).

## Maps, Charts, Figures

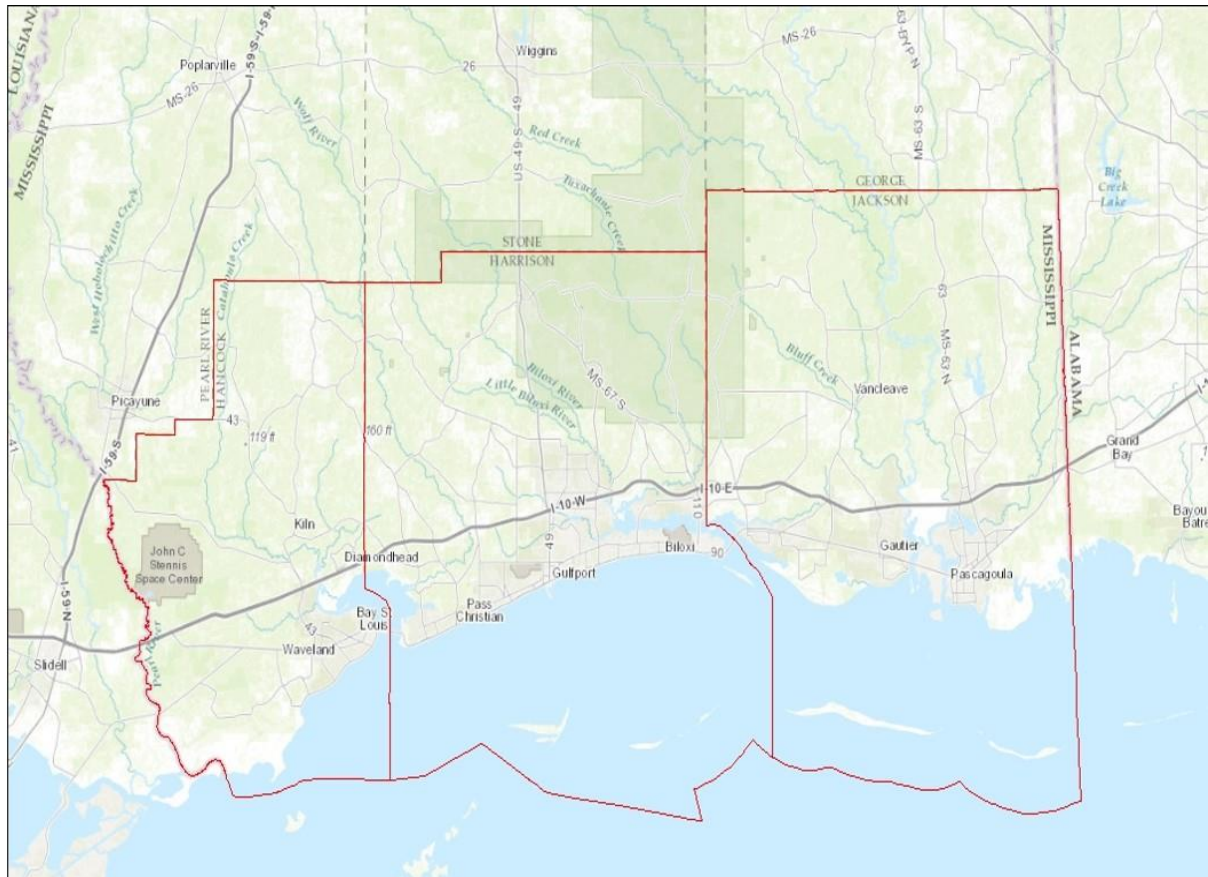


Figure 1: Map of Project area

## RESTORE Council FPL 3 Proposal Document

### **General Information**

*Proposal Sponsor:*

Mississippi Department of Environmental Quality

*Title:*

Water Quality Improvement Program for Coastal Mississippi Waters

*Project Abstract:*

This program will support the restoration of water quality in Mississippi Gulf Coast Region through the identification and implementation of water quality improvement projects. The RESTORE Council and coastal stakeholders of Mississippi have both prioritized the improvement of water quality for promoting ecosystem health in addition to restoring and revitalizing Mississippi's economy. Water quality degradation in coastal systems is a pervasive concern gulf-wide. Causes of degradation are not limited to nutrient pollution and associated hypoxia but also include bacteriological sources. Water quality degradation is often attributed to urban runoff, discharge, and overflow issues associated with aging or insufficient wastewater management. Activities within this program may run concurrently and include planning, engineering and design, conversion from septic-to-sewer, implementation of new stormwater and wastewater systems, and repairing/upgrading existing stormwater and wastewater systems. This program would be coordinated with other water quality improvement efforts under other related funding streams to maximize outcomes. The conversion of septic-to-sewer and the implementation of stormwater and wastewater improvement practices is anticipated to reduce non-point source pollutant loads to downstream coastal receiving water bodies. This will result in an improvement in water quality of coastal waters and thus have in-situ benefits to living coastal marine resources.

*FPL Category:* Cat1: Planning/ Cat2: Implementation

*Activity Type:* Program

*Program:* Water Quality Improvement Program for Coastal Mississippi Waters

*Co-sponsoring Agency(ies):* N/A

*Is this a construction project?:* No

*RESTORE Act Priority Criteria:*

(I) Projects that are projected to make the greatest contribution to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region, without regard to geographic location within the Gulf Coast region.

(II) Large-scale projects and programs that are projected to substantially contribute to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast ecosystem.

(III) Projects contained in existing Gulf Coast State comprehensive plans for the restoration and protection of natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region.

(IV) Projects that restore long-term resiliency of the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands most impacted by the Deepwater Horizon oil spill.

*Priority Criteria Justification:*

Coastal water quality issues are of great concern to the State and have been identified as a Gulf-wide priority. By addressing water quality degradation, this proposed program will make the greatest contribution to restoring and protecting coastal resources. Given the interest across multiple states, it is a large-scale contribution to a pervasive Gulf-wide problem. Water Quality has been identified as a priority in multiple plans:

- The Mississippi Gulf Coast Ecosystem Restoration Plan identifies water resources as a priority program.
- The Gulf Coast Ecosystem Restoration Task Force identified restoration of water quality as one of four main restoration goals, with reduction of pollutants and pathogens from storm water flows listed as a major action under that goal.
- The Ocean Conservancy identified reduction of land-based pollutants as important to marine resources.
- The National Wildlife Federation discusses the importance of water quality near-shore for a host of habitats and species.
- Mississippi Comprehensive Wildlife Conservation Strategy highlights stormwater runoff as a threat to habitats associated with developed areas that should be managed.

By mitigating water quality degradation issues, the State is investing in a program that will contribute to the long-term resilience of the State's resources, specifically multiple living coastal marine resources. Reducing the likelihood of hypoxia and excessive nutrient loading, enhances the resilience of resources that are directly tied to MS and other Gulf state economies.

*Project Duration (in years):* 10

**Goals**

*Primary Comprehensive Plan Goal:*

Restore Water Quality and Quantity

*Primary Comprehensive Plan Objective:*

Restore, Improve, and Protect Water Resources

*Secondary Comprehensive Plan Objectives:*

N/A

*Secondary Comprehensive Plan Goals:*

N/A

*PF Restoration Technique(s):*

Reduce excess nutrients and other pollutants to watersheds: Erosion and sediment control

Reduce excess nutrients and other pollutants to watersheds: Stormwater management

Reduce excess nutrients and other pollutants to watersheds: Wastewater system improvements

## **Location**

### *Location:*

Coastal Zone of Mississippi, which impacts the coastal waters of the State of Mississippi including bays, estuaries, streams, and the Mississippi Sound

### *HUC8 Watershed(s):*

South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Mississippi Coastal)

### *State(s):*

Mississippi

### *County/Parish(es):*

MS - Hancock

MS - Harrison

MS - Jackson

### *Congressional District(s):*

MS - 4

## **Narratives**

### *Introduction and Overview:*

#### General Description of Activity:

The Water Quality Improvement Program (WQIP) will support the restoration of water quality of Mississippi's coastal water resources through the identification and implementation of water quality improvement projects. Improvement projects may include, but are not limited to, the conversion from septic-to-sewer, the construction of new stormwater and wastewater systems, and the repairing and/or upgrading of existing stormwater and wastewater systems that would result in the improvement of water quality and the restoration and protection of natural resources.

Implementation may also include, but is not limited to, engineering, design, and permitting, MDEQ and/or eligible sub-recipients (e.g., municipalities, counties, utility authorities) may implement components of individual projects within the program.

#### Primary Goal and Objective:

The Gulf Coast Ecosystem Restoration Council's (RESTORE Council) 2016 Comprehensive Plan Update outlines five goals to provide an overarching framework for integrated and coordinated restoration approach to region-wide Gulf Coast Restoration. The primary goal addressed by the WQIP is Restore Water Quality and Quantity. The Mississippi WQIP would improve water quality within Mississippi coastal waters, including priority bays and estuaries, coastal rivers and streams, along Mississippi coastal beachfronts, and within the Mississippi Sound. The activities of the WQIP are consistent with RESTORE Council's primary objective of Restore, Improve, and Protect Water Resources and targets projects that reduce and treat nutrient and pollutant loading.

#### Commitments in 2016 Comprehensive Plan Update:

The following describes how the WQIP addresses the commitments set forth in the 2016 Comprehensive Plan Update:

- **Regional ecosystem-based approach to restoration:** Water quality is a pervasive environmental concern across the Gulf Coast and is a priority goal for the RESTORE Council members. This regional approach is highlighted by the collaborative and connected multi-member interests in water quality improvement and commitment to addressing foundational issues causing water quality degradation. The State of Mississippi is addressing water quality improvement across the Mississippi Gulf Coast by identifying and implementing projects to mitigate downstream water quality degradation concerns. Addressing water quality provides resiliency to multiple living coastal marine resources within Mississippi and across the Gulf.
- **Leveraging resources and partnerships:** The State of Mississippi understands how leveraging is critical for effective coastal restoration. The State of Mississippi is investing in water quality improvement projects across the Deepwater Horizon (DWH) funding streams, including the following: Natural Resource Damage Assessment (NRDA) Nutrient Reduction projects in conjunction with USDA and EPA; habitat restoration efforts under National Fish and Wildlife Foundation Gulf Environmental Benefit Fund (NFWF-GEBF); and similar water quality improvement programs under the Direct and Oil Spill Impact Components of the RESTORE Act. The State of Mississippi has collaborated with other Gulf State Council members regarding their water quality goals to develop this region-wide water quality improvement program.
- **Engagement, Inclusion, and Transparency:** The State of Mississippi's prioritization of the WQIP is based on multiple public and stakeholder engagement activities, including the Annual Mississippi Restoration Summit, the Mississippi Coastal Restoration Plan (NFWF-GEBF) and the RESTORE Council's public engagement for the FPL3 Planning Framework. Throughout Mississippi's restoration public engagement and planning efforts, stakeholders have consistently identified the restoration and protection of water quality as a top priority.
- **Science-based decision-making:** Monitoring, source tracking, and other science-based

decision tools will be utilized to determine the cause of water quality degradation, identify sources, and determine the effectiveness of implementation activities.

- **Delivering results and measuring impacts:** The WQIP will measure impacts of implementation through activities such as baseline monitoring, source tracking, and project and program specific monitoring. Monitoring activities for individual projects implemented will occur at the program level.

**General Description of Environmental Benefits:** *Consistent* with the RESTORE Council's water quality restoration goal, the State of Mississippi has prioritized the improvement of water quality for promoting ecosystem health and restoring and revitalizing Mississippi's economy. The conversion of septic-to-sewer (Kelly, 2019) and the implementation of stormwater and wastewater system improvement practices (Reisinger, et al., 2018) is anticipated to reduce non-point source pollutant loads to downstream coastal receiving water bodies. This will result in an improvement in water quality of coastal waters and would provide in-situ benefits to living coastal marine resources, as well as the economy of the Mississippi Gulf Coast.

**Environmental Stressors being addressed:** Water quality impairment in coastal systems is a global phenomenon (Bennett et al., 2001; Vörösmarty et al., 2010) that is not only limited to nutrient pollution and associated hypoxia, but also tied with bacteriological impairment (Mallin et al., 2000). Stressors in coastal Mississippi are discussed here.

***Pollutant Loading:*** Bacterial loading from pollutant sources results in beach advisories and oyster reef closures (with indirect consequences on coastal workforce and economies). Nutrient loadings result in hypoxia development resulting in increased mortality of multiple living coastal and marine resources, both sedentary and mobile species. As a result of hypoxia, there is an additional possibility of harmful algal blooms occurring, posing both acute and chronic human health risks.

***Freshwater Inputs:*** There are numerous freshwater inputs into Mississippi's bays, estuaries, and the Mississippi Sound, including inputs from urban systems, that result in alterations to water quality. This change in water quality is often associated with changes in water column conditions (i.e., hypoxia, eutrophication, and bacterial loads), and can also lead to the body of water not meeting its intended use (i.e., recreation or fishery) (Mallin et al., 2000; Pennington and Cech, 2010; Spellman, 2010).

***Urban runoff:*** A significant amount of water quality impairment is attributed to urban runoff, discharge, and overflow issues associated with wastewater management (Dey and Truax, 2012). This is evidenced by direct contact advisories/closures, beach advisories/closures, as well as associations with storm events.

**Additional Corollary Factors:** Corollary factors that are likely contributors to the overall water quality dynamics on the coast that require consideration include source tracking of fecal coliform loads derivations, sediment load variability, and seasonal influences on bacterial levels.

**Total Cost:** \$40,000,000. Water quality implementation is scalable.

**Timeline:** 10 years

**Partners:** The State of Mississippi will coordinate with coastal municipalities, counties and utility authorities to implement projects under the WQIP.



*Alignment with FPL3 Planning Framework:* The WQIP proposal aligns with the planning framework approach to reduce excess nutrients and other pollutants to watersheds and downstream receiving waters. Planning framework techniques that are anticipated to be utilized include storm-water management, erosion and sediment control, and wastewater system improvements.

*Proposed Methods :*

This WQIP would support the restoration and protection of natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast Region (GoCoast, 2013; GCERC, 2016). Program activities may run concurrently and include project planning and selection, engineering and design (E&D), permitting, conversion from septic to sewer in coastal communities, and implementation of new and/or repairing and upgrading existing stormwater and wastewater systems. Additionally, this program will be coordinated with other water quality improvement efforts under other Deepwater Horizon related funding streams, including water quality activities funded under the Direct and Oil Spill Components of the RESTORE Act.

The scope of work for this specific proposal can be generally classified into four components:

1. *Program management and Oversight*

Program management and oversight will cover general activities associated with this program and projects funded under this program. MDEQ personnel and its contractors will provide administrative programmatic functions and/or support during the life of the grant. MDEQ, with contractual support, will also manage the data associated with this program in accordance with the procedures outlined in the Observational Data Plan and the Data Management Plan.

2. *Project Planning and Selection*

This section provides context for how the State of Mississippi anticipates selecting projects to implement within the Council–Selected Restoration Component of the WQIP. Projects may be identified through existing data and analysis that demonstrate connectivity to water quality impairments, as well as, through the source tracking process where data gaps exist. Also, MDEQ may coordinate with local city and county entities to support identification of known wastewater/stormwater system failures contributing to water quality degradation. When needed, systematic source tracking may be utilized to identify sources and stressors of water quality degradation. Source tracking uses the identified water quality impairments (e.g., beach/advisory information, etc.) to establish hotspot specific water quality sampling regimes in order to systematically work upstream to identify the source of the degradation. Source tracking activities may include water quality sampling, tracking of pollutants, flow monitoring, stormwater and wastewater system testing, microbial source tracking, and could also include the sampling of marine nearshore sediments to provide an initial assessment of pollutant loading in the system. The source tracking process provides the analytical guidance and outlines the next steps for project identification, when needed. The source tracking process would determine hot spots for bacterial concentrations moving along an upstream gradient. Tributary contributions may be evaluated by examining the respective contributions, including potential concentrations and loads. Water sample analysis may be utilized to refine specific project and/or the source contamination project areas. Once an area or a specific project has been identified, additional due diligence (i.e., smoke testing, dye testing, and/or camera inspection), project scoping and coordination may be undertaken. Due diligence for individual projects would be unique and require varying degrees of additional work and may include cost benefit analyses, economic feasibility, preliminary engineering, environmental compliance and additional pre-construction activities.

3. *Engineering and design, permitting, and implementation*

Implementation may include, but is not limited to, engineering and design, permitting, small and

large scale septic-to-sewer conversions, and any needed repairs, upgrades, or new construction of stormwater and wastewater management systems. MDEQ and/or eligible sub-recipients may implement components of individual projects within the program. Engineering, design, and permitting would be conducted in accordance with the applicable engineering and design guidelines and standards. For each project selected for implementation, specific workplans (including, but not limited to, budget and budget narrative, project narrative, milestones, environmental compliance, updates to the program ODP/DMP, and GIS files) would be provided to the RESTORE Council with updated project level information to facilitate the release of appropriate funds.

#### 4. *Post Implementation Monitoring*

Monitoring would follow milestones as described in the individual project workplans, as well as additional monitoring measures within the Program. Monitoring could include as built defined dimensions, lengths, surveys describing construction activities, as well as other construction related milestones. From a water quality monitoring perspective, all sampling collection, handling, transportation and analyses would occur according to state and federal QA/QC guidelines. Monitoring requirements will be unique for each project. Pre-implementation, baseline sampling, determination of pollutant of concern, and sampling design of post construction monitoring would be considered in developing a monitoring plan. While the project identification and evaluation process is linear, it is likely that there will be multiple processes occurring simultaneously across coastal Mississippi (e.g., one project in E&D phase, while another project is in post-construction monitoring phase). Water quality core parameter guidance will be project specific, but would reference any available RESTORE and NRDA related monitoring guidance.

#### *Environmental Benefits:*

Elevated levels of potentially harmful bacteria are one of several water quality problems that exist on the Mississippi Gulf Coast. Bacterial impairment can come from a variety of nearshore and inland sources including storm-water runoff, boating waste, sewer overflows, septic system failures, wildlife, and other human activities. Nationwide, failure rates for septic systems vary, but the regional rate of septic failure is reported to range between 5% and 40%, with an average of about 10% (Swann 2008). Maryland and Virginia have reported failure rates of 5% for their septic systems (Fehr and Pae, 1997). Iverson (2019) documented statistically significantly higher nutrient exports from watersheds with high density of septic systems (approx. 1.8 systems / ha). Mass exports of total dissolved nitrogen and phosphate from high density watersheds were approximately 5 to 10 times higher than control and low density watersheds.

Septic systems by their very design are intended to leak sewage (Harrison et al., 2012). Converting septic to sewer is a major component of dealing with water pollution issues. Septic to sewer conversion in coastal watersheds are critical to avoid hydraulic and treatment failures as well as subsurface plumes that are typical of septic system failures. Multiple studies demonstrate hydraulic failures as well as subsurface plumes of dissolved nitrogen and phosphorus which have direct impacts to downstream water bodies (Gilliom and Patmont, 1983; Carodona, 1998).

Restoration and improvement of the quality of water as a natural resource will benefit the marine/coastal ecosystems, habitats, and fisheries, and provide economic benefits to the Mississippi Gulf Coast Region. Water quality degradation in coastal systems is a global phenomenon (Bennett et al., 2001; Vörösmarty et al., 2010; Lymer et al., 2018) and includes nutrient pollution and associated hypoxia (Diaz and Rosenberg, 2008) as well as enhanced bacteriological concentrations and loads (Mallin et al., 2000; O'Mullan et al., 2019). There are numerous freshwater inputs into Mississippi's bays, estuaries, and the Mississippi Sound, that result in alterations to water quality (Mickle et al., 2018). This change in water quality is often associated with changes in water column conditions (i.e., hypoxia, eutrophication, and bacterial loads) and can lead to the body of water not meeting its

intended use classification (i.e., recreation or warm water fishery) (Mallin et al., 2000; Pennington and Cech, 2010; Spellman, 2010). Wastewater management is often the most visible contributor to water quality degradation and is often associated with urban runoff, as well as discharge and sanitary sewer overflow (SSOs). The EPA estimates that there are at least 23,000 – 75,000 SSOs per year in the U.S. (EPA, N.D.), many of which are not specifically associated with impaired water listings, TMDLs, or other criteria. Urban wastewater connects directly to coastal marshes and the Mississippi Sound through canals and bayous. There are numerous studies and governmental reports that point to SSOs impacting and contributing to decreases in water quality, beach closures, shellfish bed closures, and other environmental problems (EPA, 2004; MDEQ, n.d., online).

The following objectives are set forth to improve water quality entering the Mississippi Sound and coastal waters:

- Systematic water quality evaluation and assessment to identify the source, dynamics, and most cost effective stormwater and wastewater improvement practices to improve water quality (Park et al., 1994; Sharpley et al., 2007; Spellman, 2008).
- Engineering, design, and permitting of the identified solutions (standard engineering practices, including certified and sealed plans). Conventional gravity sewers, force mains, pumping stations, treatment works, repair or construction, standard engineering principles or guidelines will vary depending on the system upgrade. Specific engineering guidelines would be informed by State agency policy decisions (MDEQ, n.d).
- Additional resources on new technologies tied to upgrades and improvements to wastewater collection systems (Sterling et al., 2010; FDEP, 2018) may be considered based on system circumstances, environmental and permitting regulations and restrictions.
- Implementation of designed stormwater and wastewater improvement practices. Implementation would follow standard construction and environmental practices, and any other applicable state and federal requirements (Walsh et al., 2005a, b; Hogan and Walbridge, 2007; Walsh et al., 2016).
- Monitoring of success of the respective practices (Kondolf and Micheli, 1995; Spellman, 2008; Lindenmayer and Likens, 2009a, 2009b; Reynolds et al., 2016). Specific wastewater discharges will be documented as project outcomes, as well as project-specific changes to downstream receiving waters (Fu et al., 2019; Tolouei et al., 2019).

#### *Metrics:*

Metric Title: PRM011 : Restoration planning/design/permitting - # E&D plans developed : Planning, Research, Monitoring

Target: 2

Narrative: The number of E&D plans for water quality projects.

Metric Title: PRM013 : Restoration planning/design/permitting - # environmental compliance documents completed : Planning, Research, Monitoring

Target: 2

Narrative: The number of permits/compliance documents for water quality implementation project.

Metric Title: PRM004 : Monitoring - # monitoring programs implemented : Planning, Research, Monitoring

Target: 2

Narrative: The number of monitoring programs for water quality improvement projects moved forward to implementation. The monitoring programs will reflect site specific monitoring needs.

### *Risk and Uncertainties:*

Uncertainties could lie in inadequate planning to achieve desired water quality improvements as a result of the repair, upgrade, and/or construction that is implemented. Further uncertainty lies in the exact water quality improvement practice that needs to be implemented, the extent of the practice, as well as the utilization of multiple practices. This uncertainty results in a highly variable cost for implementation. By undertaking due diligence on source tracking and narrowing in, through water quality monitoring and beach advisory information to the area of concern, the risk associated with not seeing measurable improvements in water quality as a result of implementation are mitigated. Furthermore, through specific tasks and objectives for planning and evaluation, uncertainty in the scientific basis for implementation is reduced, as well as, the types of practices to be implemented and their respective costs. MDEQ has significant experience in implementing water quality improvement projects across the State of Mississippi, with a particular emphasis on the Mississippi Gulf Coast. MDEQ managed and provided oversight to the Community Development Block Grant (CDBG) program that invested over \$600 million in drinking water and wastewater improvement projects in the Mississippi coastal counties affected by Hurricane Katrina. An identified risk of implementation of best management practices for water quality improvement in riparian and in-stream areas is the effect on water flow, specifically causing flooding and drainage issues to upstream urban areas. Specific engineering and design of wastewater/stormwater improvement practices will evaluate the risk for said practices to influence and control water flow and ensure that design maximizes water quality mitigation. With diligent and effective planning prior to implementation, as well as post construction monitoring, uncertainties and risks of not improving water quality moving into the Mississippi Sound are significantly decreased. Sea level rise and storm surge are two risks and uncertainties to project implementation performance. Given the variability in sea level rise prediction as well as the anticipated immediate ecosystem service benefits of the implementation of sewer and wastewater infrastructure, is unlikely that pipe infrastructure implementation will consider sea-level rise. Hummel et al. (2018) summarized a national assessment of coastal wastewater treatment facilities at risk for sea level rise. Mississippi was classified as low risk, with low exposure across a sea level rise gradient from 1ft to 6ft. However, with respect to storm surge, certain upgrades (i.e., pump stations, backflow valves, electrical connections etc.) could be based on storm surge predictions and to ensure lack of failure under those conditions.

### *Monitoring and Adaptive Management:*

Monitoring would follow milestones as described in the individual project workplans, as well as additional monitoring measures within the Program. Monitoring could include as built defined dimensions, lengths, surveys describing construction activities, as well as other construction related milestones. From a water quality monitoring perspective, implemented projects will be monitored for their effectiveness in improving water quality in the respective identified water resource degradation, as applicable. For all impairments, trends over time could be compared to long-term advisory information to document changes. These trends could also be closely paired with environmental conditions of water flow and climate to highlight and provide reasoning for any documented changes. Additional monitoring and evaluation criteria could include: modeling estimates for changes in infiltration and inflow, pressure gauge and/or smoke testing, pollutant monthly and stormwater event sampling, and flow. Regardless of the criteria, pre/post implementation methodologies will inform the identification of project changes to water quality. Post implementation monitoring will identify project specific outcomes. If monitoring does not show progress towards those outcomes, additional vetting of project implementation success, and/or the identification of additional problem areas may occur to further improve water quality success criteria.

Water quality improvement projects implemented through this program may be operated and maintained by either MDEQ or eligible sub-recipient(s) both during and after the period of performance. Operation and maintenance activities necessary beyond the scope of work for this

program are anticipated to be funded by local funding sources.

*Data Management:*

MDEQ will store and manage an ISO-compliant relational database and geospatial database on a server that utilizes the Amazon Web Services cloud-based server environment. In addition to the network and server administration provided by Amazon Web Services, MDEQ manages the server, operating system, software and services. GIS information is backed up in three locations. The data is included in server snapshots performed by and stored at Amazon Web Services. Duplicate datasets are also located on a secure, cloud-based system. This system includes separate cloud backup and storage on two separate network attached storage arrays located in Gulfport and Jackson, MS. Finally, copies of the data are stored on an internal server. All electronic data and metadata will be delivered to the RESTORE Council on a yearly basis for review and approval.

*Collaboration:*

The State of Mississippi, through Comprehensive Plan Commitment and Planning Support activities, has collaborated with Gulf state Council members to identify, develop and refine this region-wide water quality improvement request. To advance the proposed program, MDEQ will collaborate with local municipalities, counties, utility authorities and other relevant agencies to identify and mitigate sources (e.g. infrastructure system failures) contributing to water quality impairments.

*Public Engagement, Outreach, and Education:*

The State of Mississippi's prioritization of the WQIP for Coastal Mississippi Waters is based on multiple public and stakeholder engagement activities. Throughout Mississippi's restoration public engagement and planning efforts, stakeholders have consistently identified the restoration and protection of water quality as a top priority. The following are examples of public engagement, outreach and education activities which were considered in the selection of this proposal:

Annual Mississippi Restoration Summit: MDEQ has hosted the Mississippi Restoration Summit annually for four consecutive years. The public is invited to learn about restoration projects and programs and to provide input on current and future priorities for restoration. The priority of water quality has been highlighted each year and MDEQ's ongoing water quality improvement program planning and implementation efforts were the central theme of the 2019 Summit. Based on the input received at the annual summits, investing in water quality restoration and protection continues to be a top priority of stakeholders.

Mississippi Coastal Restoration Plan (NFWF-GEBCF): In 2014, MDEQ undertook a multi-year planning effort to develop a comprehensive plan to support NFWF-GEBCF restoration program activities in Mississippi. Development of the Mississippi Coastal Restoration Plan included extensive engagement with the public, NGO's/subject matter experts and state and federal agencies. MDEQ's community engagement activities included community conversation and resource summits held in each of the three coastal counties. The community conversation meetings had more than 200 participants, representing 125 organizations, across the three coastal county locations. The importance of water quality restoration and enhancement was a top common value voiced across all three coastal counties.

RESTORE Act Mississippi State Expenditure Plan: Since 2016, MDEQ has solicited stakeholder input to support planning and development of the Mississippi State Expenditure Plan (MSEP). Engagement with a wide range of stakeholders, including private citizens, non-governmental organizations, business owners, elected officials, and other community leaders, has informed the priorities for restoration. During the 2019 MSEP planning and development, MDEQ received input from stakeholders that reaffirmed the priorities of water quality, restoring and revitalizing the economy, and community resilience.

*Leveraging:*

Funds: \$5,000,000.00

Type: Bldg on Others

Status: Received

Source Type: Other Federal

Description: Coastal streams and watersheds have been impacted by urban development, hydrologic alterations, erosion, invasive species and other factors that have led to a decrease in water quality discharging into the Mississippi Sound. The purpose of the Strategic Stream Restoration Program is to implement coastal stream restoration strategies in the three Mississippi coastal counties to improve water quality entering the Mississippi Sound, as well as increase ecosystem function of the streams.

Funds: \$11,000,000.00

Type: Bldg on Others

Status: Received

Source Type: Other Federal

Description: This Mississippi Gulf Coast Water Quality Improvement Program grant supports the restoration and protection of natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Mississippi Gulf Coast Region through the identification and implementation of water quality improvement projects. Improvement projects may include, but are not limited to, the construction of new or the repairing/upgrading of existing stormwater and wastewater systems, including conveyance and treatment, to mitigate water quality issues in a coastal water resource.

Funds: \$49,000,000.00

Type: Bldg on Others

Status: Received

Source Type: Other Federal

Description: This Mississippi Gulf Coast Water Quality Improvement Program grant supports the restoration of water quality of Mississippi's coastal water resources by targeting stormwater sources, discharges, and/or wastewater improvements that will result in the improvement of water quality and the restoration and protection of natural resources. Efforts to achieve such improvements include enhancing the State's understanding of source water quality problems, implementing upgrades, repairs, and/or construction activities associated with stormwater and wastewater systems to restore water quality and promote ecosystem health.

Funds: \$3,600,000.00

Type: Bldg on Others

Status: Received

Source Type: Other

Description: The Coastal Streams and Habitat Initiative was funded by NFWF-GEBF. The Coastal Stream and Habitat Restoration and Management Initiative created strategies and restoration designs to abate threats to priority coastal streams and restore associated habitat.

Funds: \$500,000.00

Type: Bldg on Others

Status: Received

Source Type: Other

Description: The Design Challenge for Improvement of Water Quality from Beach Outfalls was funded by NFWF-GEBF to encourage individuals and teams to compete to create innovative “green” solutions to address the water quality impacts of beach outfalls. This project funded a design competition to find innovative eco-solutions for water quality impairments associated with beach outfalls in Mississippi.

Funds: \$4,000,000.00

Type: Bldg on Others

Status: Received

Source Type: Other

Description: The Upper Pascagoula River Water Quality Enhancement project includes development and implementation of conservation plans to reduce nutrient and sediment contributions in the watershed. The project includes an extensive outreach program to land owners. Conservation practices will be planned and implemented on property throughout the watershed with emphasis given to properties bordering rivers and streams.

*Environmental Compliance:*

Environmental compliance documentation will be updated. Similar to project specific implementation information, environmental compliance checklists and required environmental compliance information will be provided on individual projects as identified. All specific environmental compliance needs will be identified during project identification and development activities.

*Bibliography:*

Alabama Soil and Water Conservation Committee. 2018. Alabama handbook for erosion control, sediment control, and stormwater management on construction sites and urban areas: Volume 1 – developing plans and designing best management practices. Available online:

<https://www.dot.state.al.us/dsweb/divped/Stormwater/pdf/AlabamaHandbookforErosionControl.pdf> Last accessed: 3.23.2020

Bennett, E.M. Carpenter, S.R., Caraco, N.F. 2001. Human impact on erodible phosphorus and eutrophication: a global perspective. *Bioscience* 51(3), 227-234

Carodona, M. 1998. Nutrient and Pathogen Contributions to Surface and Subsurface Waters From On-site Wastewater Systems - A Review. North Carolina State University Cooperative Extension Service

Dey, A., and D.D. Truax. 2012. Evaluation of On-site Wastewater Disposal Systems in Mississippi Coastal Areas. *Water Air Soil Pollution*, 223, 2145–2156

Diaz, R.J., Rosenberg, R. 2008. Spreading dead zones and consequences for marine ecosystems. *Science*, 321, 626-929

EPA (no date). The Environmental Protection Agency – National Pollutant Discharge Elimination System (NPDES) – Sanitary Sewer Overflows (SSOs). Available online:

<https://www.epa.gov/npdes/sanitary-sewer-overflows-ssos> Last accessed: 4.2.2020

EPA (2004). Report to Congress on Impacts and Control of Combined Sewer Overflows and Sanitary Sewer Overflows. Environmental Protection Agency. Available online:

[https://www.epa.gov/sites/production/files/2015-10/documents/csosortc2004\\_full.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/csosortc2004_full.pdf) Last Accessed: 4.2.2020

FDEP (2018). Restoring Bacteria-Impaired Waters: A toolkit to help local stakeholders identify and eliminate potential pathogen problems. Version 3.0. 63 pg. Available online:

[https://floridadep.gov/sites/default/files/Restoring\\_Bacteria-Impaired\\_Waters\\_Toolkit\\_082018.pdf](https://floridadep.gov/sites/default/files/Restoring_Bacteria-Impaired_Waters_Toolkit_082018.pdf) Last Accessed: 4.2.2020

Fehr, Stephen and Peter Pae. 1997. "Aging Septic Tanks Worry D.C. Suburbs." *Washington Post*, May 18, 1997.

Fu, X., Goddard, H., Wang, X., Hopton, M.E. 2019. Development of a scenario-based stormwater management planning support system for reducing combined sewer overflows (CSOs). *Journal of Environmental Management*, 236, 571-580

GCERC, 2016. Comprehensive Plan Update 2016. Restoring the Gulf Coast's ecosystem and the economy. Gulf Coast Ecosystem Restoration Council, New Orleans, Louisiana.

Georgia Department of Natural Resources. 2001. Georgia Stormwater Management Manual.

Available online: <http://www.lex-co.com/Departments/PublicWorks/GSMMVol2.pdf> Last accessed: 3.25.2020

GoCoast 2013. GoCoast 2020 Final Report. GoCoast 2020 Commission, Final Plan Issued January, 2013.



Gilliom, R.J. and C. Patmont. 1983. "Lake Phosphorus Loading from Septic Systems by Seasonally Perched Groundwater." *Journal of the Water Pollution Control Federation* 55 (10), 1297-1305.

Griffith, J.F., B.A. Layton, A.B. Boehm, P.A. Holden, J.A. Jay, C. Hagedorn, C.D. McGee, and S.B. Weisburg. 2013. The California microbial source identification manual: a tiered approach to identifying fecal pollution sources to beaches. Technical Report 804, Southern California Coastal Water Research Project (SCCWRP).

Harrison M., Stanwyck, E., Beckingham, B., Starry, O., Hanlon, B., Newcomer, J. 2012. Smart growth and the septic tank: wastewater treatment and growth management in the Baltimore region. *Land Use Policy* 29 (3), 483-492

Hogan, D.M., Walbridge, M.R. 2007. Best management practices for nutrient and sediment retention in urban stormwater runoff. *Journal of Environmental Quality* 36, 386-395

Hummel, M.A., Berry, M.S., Stacey, M.T. 2018. Sea level impacts on wastewater treatment systems along the US coasts. *Earth's Future* 6 (4), 622-633.

Iverson, G. 2019. Nutrient contributions from septic systems in nutrient-sensitive watersheds: quantifying nutrient inputs, reductions methods, and economic feasibility. Doctoral Dissertation, East Carolina University. Available online: <https://thescholarship.ecu.edu/handle/10342/7220> Last accessed: 3.23.2020.

Kelly, E.A. 2019. Developing water quality policies: assessing natural environmental characteristics and anthropogenic impact on microbiological water quality at recreational beaches. University of Miami, Ph.D. dissertation, Department of Ecosystem Science and Policy. Available online: [https://scholarlyrepository.miami.edu/oa\\_dissertations/2279/](https://scholarlyrepository.miami.edu/oa_dissertations/2279/) Last accessed: 4.4.2020.

Kondolf, G.M., Micheli, E.R. 1995. Evaluating stream restoration projects. *Environmental Management* 19(1), 1-15

Lindenmayer, D.B., Likens, G.E. 2009a. Improving ecological monitoring. *Trends in Ecology and Evolution* 24, 200-201.

Lindenmayer, D.B., Likens, G.E. 2009b. Adaptive monitoring: a new paradigm for long-term research and monitoring. *Trends in Ecology and Evolution* 24, 482-486.

Lymer, B.L., Weinberg, J., Clausen, T.J. 2018. Water quality management from source to sea: from global commitments to coordinated implementation. *Water International* 43(3), 349-360

Mallin, M.A., Williams, K.E., Esham, E.C., Lowe, R.P. 2000. Effect of human development on bacteriological water quality in coastal watersheds. *Ecological Applications* 10(4), 1047-1056

Mississippi Department of Environmental Quality (MDEQ) (no date/variable dates). Guidance for the design of publicly owned wastewater facilities, Mississippi Department of Environmental Quality. Available online: <https://www.mdeq.ms.gov/about-mdeq/grants-loans-and-trust-funds-available-through-mdeq/guidance-for-the-design-of-publicly-owned-wastewater-facilities/> Last Accessed: 4.4.2020

MDEQ 2011. Mississippi handbook for erosion control, sediment control and stormwater management on construction sites and urbane areas. Available online: [https://www.mdeq.ms.gov/wp-content/uploads/2017/05/Volume\\_1-1.pdf](https://www.mdeq.ms.gov/wp-content/uploads/2017/05/Volume_1-1.pdf) Last accessed: 3.27.2020.

Mickle, P.F., Herbig, J.L., Somerset, C.R., Chudzik, B.T., Lucas, K.L., Fleming, M.E. 2018. Effects of annual droughts on fish communities in Mississippi sound estuaries. *Estuaries and Coasts* 41(5), 1475-1485

O'Mullan, G.D., Juhl, A.R., Reichert, R., Schneider, E., Martinez, N. 2019. Patterns of sediment associated fecal indicator bacteria in an urban estuary: benthic-pelagic coupling and implications for shoreline water quality. *Science of the Total Environment* 656, 1168-1177

Park, S. W., Mostaghimi, S., Cooke, R.A., McClellan, P.W. 1994. BMP impacts on watershed runoff, sediment, and nutrient yields. *Water Resources Bulletin* 30,1011-1023.

Pennington, K. L., and T. V. Cech. 2010. Introduction to water resources and environmental issues. Cambridge University Press, Cambridge, UK.

Reisinger, A.J., Woytowitz, E., Majcher, E., Rosi, E.J., Belt, K.T., Duncan, J.M., Kaushal, S.S., Groffman, P.M. 2018. Changes in long-term water quality of Baltimore streams are associated with both gray and green infrastructure. *Limnology and Oceanography* 64 (S1), S60-S76

Reynolds, J.H., Knutson, M.G., Newman, K.B., Silverman, E.D., Thompson, W.L. 2016. A road map for designing and implementing a biological monitoring program. *Environmental Monitoring and Assessment* 188, 399-424

Sharpley, A. N., Krogstad, T., Kleinman, P.J.A, Haggard, B.E., Shigaki, F., Saporito, L.S. 2007. Managing natural processes in drainage ditches for nonpoint source phosphorus control. *Journal of Soil Water Conservation* 62,197-206.

Spellman, F.R. 2008. *The Science of Water: concepts and applications*. 2nd Edition. CRC Press, Taylor and Francis Group, New York, NY; Chp: 3 (pp.45-95), Chp: 8 (pp.219-287), Chp: 9 (pp.289-323), Chp: 10 (pp.325-399).

Spellman, F.R. 2010. *The Science of Environmental Pollution*. 2nd Edition. CRC Press, Taylor and Francis Group, New York, NY.

Sterling, R., Simicevic, J., Allouche, E., Condit, W., Wang, L. (2010). State of Technology for Rehabilitation of Wastewater Collection Systems. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-10/078, 2010. Available online: [https://cfpub.epa.gov/si/si\\_public\\_record\\_report.cfm?Lab=NRMRL&dirEntryId=226504](https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=226504). Last Accessed: 4.2.2020

Swann, C. 2008. The Influence of septic systems at the watershed level. *Urban Lake Management* 821- 834. Available online: <http://saublesewer.devuna.com/Documents/20080523%20The%20influence%20of%20septic%20systems%20at%20the%20Watershed%20Level.pdf> Last accessed: 3.23.2020

Tolouei, S., Burnet, J.B., Auxtixier, L., Taghipour, M., Bonsteel, J., Vo, S., Sauve, S., Prevost, M., Dorner, S. 2019. Temporal variability of parasites, bacterial indicators, and wastewater micropollutants in a water resource recovery facility under various weather conditions. *Water Research* 148, 446-458

Vörösmarty, CJ, McIntyre, PB, Gessner, MO, Dudgeon, D, Prusevich, A, Green, P, Glidden, S, Bunn, SE, Sullivan, CA, Reidy Liermann, C & Davies, PM 2010. Global threats to human water security and river biodiversity. *Nature*, vol. 467, no, 7315, pp. 555-561.

Walsh, C.J., Fletcher, T.D., Ladson, A.R. 2005a. Stream restoration in urban catchments through redesigning stormwater systems: looking to the catchment to save the stream. *Journal of the Northern American Benthological Society* 24(3), 690-705

Walsh, C.J., Roy, A.H., Feminella, J.W., Cottingham, P.D., Groffman, P.M., Morgan, R. P. 2005b. The urban stream syndrome: current knowledge and the search for a cure. *Journal of the Northern American Benthological Society* 24(3), 706-723.

Walsh, C.J., Booth, D.R., Burns, M.J. Fletcher, T.D., Hale, R.L., Hoang, L.N., Livingston, G., Rippy, M.A., Roy, A.H., Scoggins, M., Wallace, A. 2016. Principles for urban stormwater management to protect stream ecosystems. *Freshwater Science* 35(1), 398-411.

## **Budget**

### *Project Budget Narrative:*

A total of \$40,000,000 is being requested from FPL 3b to fund activities associated with the Program. The funds being requested are solely intended to be used for the planning, implementation, and monitoring of water quality related infrastructure improvement. An estimated 5% will be used for project planning, which includes project selection. An estimated 88% will be for implementation within the Program which may include, but is not limited to, project implementation related work (e.g., engineering and design, any required permitting), construction of stormwater and wastewater management systems (including upgrades and repairs), as well as possible septic to sewer conversions. Included within this implementation component is program and project administration, including administrative programmatic functions, coordination, and sub-recipient / contractual support for project implementation. An estimated 5% will be used for monitoring and adaptive management. An estimated 2% will be used for data management activities.

### *Total FPL 3 Project/Program Budget Request:*

\$ 40,000,000.00

*Estimated Percent Monitoring and Adaptive Management: 5 %*

*Estimated Percent Planning: 5 %*

*Estimated Percent Implementation: 88 %*

*Estimated Percent Project Management: N/A*

*Estimated Percent Data Management: 2 %*

*Estimated Percent Contingency: N/A*

### *Is the Project Scalable?:*

Yes

### *If yes, provide a short description regarding scalability.:*

The extent of water quality improvements is scalable based on the number, extent, and size of projects implemented. Scaling of extent will scale the level of impact.

## **Environmental Compliance<sup>1</sup>**

| <b>Environmental Requirement</b>                                     | <b>Has the Requirement Been Addressed?</b> | <b>Compliance Notes<br/>(e.g., title and date of document, permit number, weblink etc.)</b> |
|--|--|---|
| <b>National Environmental Policy Act</b>                             | N/A  | Note not provided.  |
| <b>Endangered Species Act</b>  | N/A  | Note not provided.  |
| <b>National Historic Preservation Act</b>                            | N/A  | Note not provided.  |
| <b>Magnuson-Stevens Act</b>  | N/A  | Note not provided.  |
| <b>Fish and Wildlife Conservation Act</b>                            | N/A  | Note not provided.  |
| <b>Coastal Zone Management Act</b>                                   | N/A  | Note not provided.  |
| <b>Coastal Barrier Resources Act</b>                                 | N/A  | Note not provided.  |
| <b>Farmland Protection Policy Act</b>                                | N/A  | Note not provided.  |
| <b>Clean Water Act (Section 404)</b>                                 | N/A  | Note not provided.  |
| <b>River and Harbors Act (Section 10)</b>                            | N/A  | Note not provided.  |
| <b>Marine Protection, Research and Sanctuaries Act</b>               | N/A  | Note not provided.  |
| <b>Marine Mammal Protection Act</b>                                  | N/A  | Note not provided.  |
| <b>National Marine Sanctuaries Act</b>                               | N/A  | Note not provided.  |
| <b>Migratory Bird Treaty Act</b>                                     | N/A  | Note not provided.  |
| <b>Bald and Golden Eagle Protection Act</b>                          | N/A  | Note not provided.  |
| <b>Clean Air Act</b>   | N/A  | Note not provided.  |
| <b>Other Applicable Environmental Compliance Laws or Regulations</b> | N/A  | Note not provided.  |

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<sup>1</sup> Environmental Compliance document uploads available by request ([restorecouncil@restorethegulf.gov](mailto:restorecouncil@restorethegulf.gov)).

## Maps, Charts, Figures

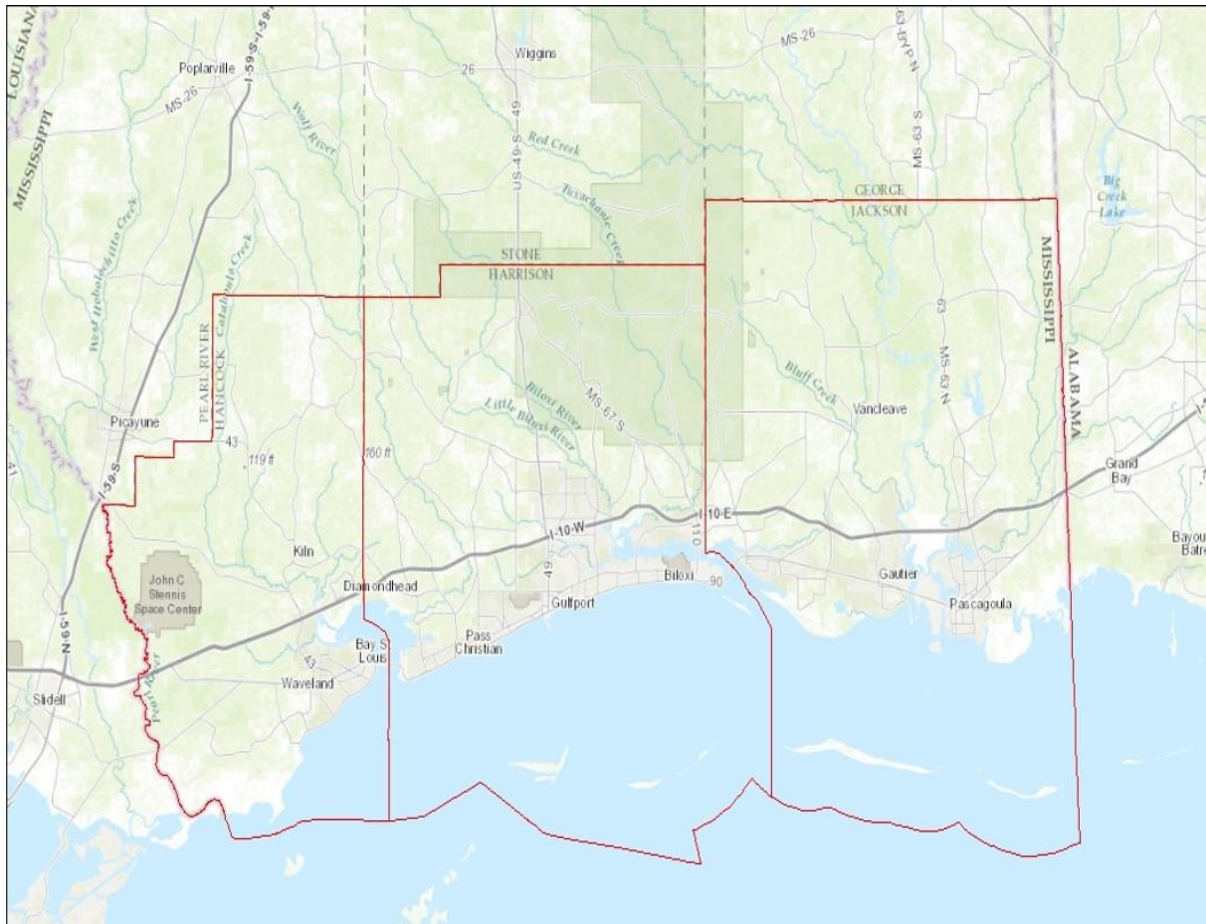


Figure 1: Map of project location

FPL 3b Internal Staff Review of Proposal Submitted 4/24/2020

|   |  |            |             |
|---|--|------------|-------------|
|   |  |            |             |
| Project/Program   | Water Quality Improvement Program for Coastal Mississippi Waters |            |             |
| Primary Reviewer  | John Ettinger  | Sponsor    | Mississippi |
| EC Reviewer   | John Ettinger  | Co-Sponsor |             |
|   |  |            |             |
|   |  |            |             |
| 1. Is/Are the selected Priority Criteria supported by information in the proposal?  |  |            | Yes         |
| Notes   |  |            |             |
|   |  |            |             |
| 2. Does the proposal meet the RESTORE Act geographic eligibility requirement?   |  |            | Yes         |
| Notes   |  |            |             |
|   |  |            |             |
| 3. Are the Comprehensive Plan primary goal and primary objective supported by information in the proposal?  |  |            | Yes         |
| Notes   |  |            |             |
|   |  |            |             |
| 4. Planning Framework: If the proposal is designed to align with the Planning Framework, does the proposal support the selected priority approaches, priority techniques, and/or geographic area? |  |            | Yes         |
| Notes   |  |            |             |
|   |  |            |             |
| 5. Does the proposal align with the applicable RESTORE Council definition of project or program?  |  |            | Yes         |
| Notes   |  |            |             |
|   |  |            |             |
| 6. Does the budget narrative adequately describe the costs associated with the proposed activity?   |  |            | No          |

|   |   |  |                         |
|---|---|--|-------------------------|
| Notes   | <p>Council staff recommend that the sponsor edit the budget narrative to specifically identify the amount of funding being requested in FPL Category 1 and FPL Category 2. The proposed budget indicates that approximately 5% of the overall program cost would be dedicated to planning, which would include site identification. and that engineering, design, and permitting are being budgeted as implementation. The proposal places the implementation component of this program in FPL Category 2. Program and project administration are also included in implementation. Council staff recommend that the sponsor consider revising the proposed budget narrative to include site-specific planning activities such as engineering, design, and permitting as components of the overall planning portion of the budget, thereby making it clear that these planning activities are being proposed for funding in FPL Category 1. Program management, monitoring and adaptive management and data management activities should also be considered for inclusion in FPL Category 1. Program management in particular, currently in implementation with no specific amount budgeted, is critical throughout the duration of a program and is recommended for inclusion in Category 1. Since a portion of the requested funding would be put toward construction (e.g., implementation and repair of stormwater and wastewater systems and conversion from septic to sewer), Council staff recommend the sponsor revise the answer to the question "Is this a construction project?", from "no" to "yes". Council staff also recommend including a statement in the budget narrative that the need for contingency costs will be considered as appropriate when developing individual project-specific budgets.</p> |  |                         |
| 7. Are there any recommended revisions to the selected leveraged funding categories?  |   |  | More information needed |
| Notes   | <p>The sponsor has selected the "Builds on Other Work" leveraging category to describe a number of other restoration investments related to this proposed program. In some cases, the source of the leveraged funding is named. It would be helpful if the proposal could name the funding sources for all leveraged investments in this section.</p>   |  |                         |
| 8. Have three external BAS reviews been completed?                                    |   |  | More information needed |
| Notes   | <p>Please see the external BAS review comments, and external reviews summary attached with these review comments.</p>   |  |                         |
| 9. Have appropriate metrics been proposed to support all primary and secondary goals? |   |  | No                      |
| Notes   | <p>1) Council staff recommend removing metric "PRM004 - # monitoring programs implemented" from this proposal. Because project benefits should be monitored for all RESTORE-funded projects, RESTORE Council metric "PRM004 - # monitoring programs implemented," should not be selected unless it will capture activities apart from project-level monitoring of anticipated project benefits. 2) The proposed metrics do not provide sufficient support for the primary goal of this program, Restore water quality and quantity. The Monitoring and Adaptive Management section states that project-specific monitoring could include trends in identified resource impairments; however, this is not</p>  |  |                         |



|   |  |
|---|--|
|   | reflected through corresponding metrics. Council staff recommend revising the proposal to include metrics "HM001 - Lbs. N avoided or removed", "HM003 - Lbs. P avoided or removed", "HM004 - Lbs. sediment avoided or removed", and "RES004 - CFU Reduction in bacterial loads". Though projects are yet to be specified, metrics appropriate for the anticipated techniques should still be selected at the proposal stage. Each metric need not apply to each potential project under a proposed program. Should the proposed program be selected for funding, metrics may be added, removed, or replaced, and metric targets may be adjusted, as appropriate at the project workplan application stage. |
|   |  |
| 10. Environmental compliance: If FPL Category 1 has been selected for the implementation component of the project or program, does the proposal include environmental compliance documentation that fully supports the selection of Category 1? | N/A  |
| Notes   | Council staff recommends editing the environmental compliance checklist to indicate "Yes" for NEPA, then writing the following in the corresponding notes section: "In Category 1, this proposed activity involves only planning actions. These planning actions are covered by the Council's NEPA Categorical Exclusion for planning, research or design activities (Section 4(d)(3) of the Council's NEPA Procedures). Additional NEPA compliance will be required for Category 2 efforts."  |
|   |  |
| 11. Geospatial Compliance: Have the appropriate geospatial files and associated metadata been submitted along with a map of the proposed project/program area?  | More information needed  |
| Notes   | The sponsor selected Pascagoula watershed only. The GIS project boundary submitted overlaps Lower Pearl, Mississippi Coastal, Escatawpa, and Black also. Council staff recommends adding Lower Pearl, Mississippi Coastal, Escatawpa, and Black watersheds.  |
|   |  |

## **COUNCIL SUMMARY COMMENTS**

### **Budget Narrative:**

Council staff recommend that the sponsor edit the budget narrative to specifically identify the amount of funding being requested in FPL Category 1 and FPL Category 2. The proposed budget indicates that approximately 5% of the overall program cost would be dedicated to planning, which would include site identification. and that engineering, design, and permitting are being budgeted as implementation. The proposal places the implementation component of this program in FPL Category 2. Program and project administration are also included in implementation. Council staff recommend that the sponsor consider revising the proposed budget narrative to include site-specific planning activities such as engineering, design, and permitting as components of the overall planning portion of the budget, thereby making it clear that these planning activities are being proposed for funding in FPL Category 1. Program management, monitoring and adaptive management and data management activities should also be considered for inclusion in FPL Category 1. Program management in particular, currently in implementation with no specific amount budgeted, is critical throughout the duration of a program and is recommended for inclusion in Category 1. Since a portion of the requested funding would be put toward construction (e.g., implementation and repair of stormwater and wastewater systems and conversion from septic to sewer), Council staff recommend the sponsor revise the answer to the question "Is this a construction project?", from "no" to "yes". Council staff also recommend including a statement in the budget narrative that the need for contingency costs will be considered as appropriate when developing individual project-specific budgets.

**MDEQ Response:** Revised to reflect adjustments to Category 1 and Category 2 funding. The answer to the question "Is this a construction project?" has been changed to "yes".

### **Leveraged Funding Categories:**

The sponsor has selected the "Builds on Other Work" leveraging category to describe a number of other restoration investments related to this proposed program. In some cases, the source of the leveraged funding is named. It would be helpful if the proposal could name the funding sources for all leveraged investments in this section.

**MDEQ Response:** MDEQ provided all the details already. Sources provided, project names, source type were all provided.

### **Metrics:**

1) Council staff recommend removing metric "PRM004 - # monitoring programs implemented" from this proposal. Because project benefits should be monitored for all RESTORE-funded projects, RESTORE Council metric "PRM004 - # monitoring programs implemented," should not be selected unless it will capture activities apart from project-level monitoring of anticipated project benefits. 2) The proposed metrics do not provide sufficient support for the primary goal of this program, Restore water quality and quantity. The Monitoring and Adaptive Management section states that project-specific monitoring could include trends in identified resource impairments; however, this is not reflected through corresponding metrics. Council staff recommend revising the proposal to include metrics "HM001 - Lbs. N avoided or removed", "HM003 - Lbs. P avoided or removed", "HM004 - Lbs. sediment avoided or removed", and "RES004 - CFU Reduction in bacterial loads". Though projects are yet to be specified, metrics appropriate for the anticipated techniques should still be selected at the proposal stage. Each metric need not apply to each potential project under a proposed program. Should the proposed program be selected for funding, metrics may be added, removed, or replaced, and metric targets may be adjusted, as appropriate at the project workplan application stage.

**MDEQ Response:** MDEQ has included the suggested metrics and clarified between program level and project level metrics including the caveat language of applicability of metrics are to be determined.

**Environmental Compliance:**

Council staff recommends editing the environmental compliance checklist to indicate "Yes" for NEPA, then writing the following in the corresponding notes section: "In Category 1, this proposed activity involves only planning actions. These planning actions are covered by the Council's NEPA Categorical Exclusion for planning, research or design activities (Section 4(d)(3) of the Council's NEPA Procedures). Additional NEPA compliance will be required for Category 2 efforts."

**MDEQ Response:** Edit made and language added in the notes section.

**GIS / Mapping:**

The sponsor selected Pascagoula watershed only. The GIS project boundary submitted overlaps Lower Pearl, Mississippi Coastal, Escatawpa, and Black also. Council staff recommends adding Lower Pearl, Mississippi Coastal, Escatawpa, and Black watersheds.

**MDEQ Response:** Lower Pearl, Mississippi Coastal, Escatawpa and Black Watersheds will be selected including the Pascagoula.

**FPL 3b BAS Review Summary – Water Quality Improvement Program for Coastal Mississippi Waters**

**May 2020**

All reviewers agree that there is reasonable justification that the *Water Quality Improvement Program for Coastal Mississippi Waters* proposal is based on science that is pertinent to the Gulf Coast region and that maximizes the quality, objectivity, and integrity of information. Reviewers 2 and 3 agree that the proposal is based on science that uses peer-reviewed and publicly available information. Numerous citations indicate an understanding of the systems being proposed (Reviewer 3), and various elements of the proposal are supported by their inclusion or alignment to federal, regional or local programs, or the use of information generated by these programs and/or existing peer-reviewed information (Reviewer 2). However, Reviewer 1 also recommends including more recent data and sources, especially for the septic failure rates, which have changed since the mid 90's.

Reviewers generally felt that literature sources used to support the proposal were accurately and completely cited and represented in a fair and unbiased manner. Reviewer 2 points out that some citations were included in the Bibliography list, but were not included along the text, and that citations are needed to support the following elements of the proposal:

- Cite each of the multiple plans included under Priority Criteria Justification.
- The discussion of pollutant loading as identified environmental stressor.
- In the Environmental Benefits section, “Elevated levels of potentially harmful bacteria are one of several water quality problems that exist on the MS Gulf Coast”

While Reviewers 1 and 2 agreed that the scope of work provided in the proposal outlines clearly sourced methods, specific justification for these methods are not included (Reviewer 2). Reviewer 3 suggests bolstering the description of methods with additional justification for method selection. The priority criteria justification section could also be strengthened by including a description of the current conditions of WQ and characteristics of the septic and wastewater systems in the project area (Reviewer 2).

Further clarification is recommended in discussing program goals and objectives (Reviewers 1 and 3). Reviewer 1 suggests including additional information about the scale of improvement that the program is hoping to achieve, along with overall targets, which could also assist with selecting projects. Reviewers 1 and 2 agreed that the metrics described in the proposal align with its goals and objectives. However, Reviewer 3 stated that “having a metric of compliance documents completed does not, in this reviewer’s opinion, constitute a metric of success. Rather it indicates effort to initiate needed processes.”

The environmental benefits of the proposed program and the underlying environmental stressors are clearly identified (all reviewers), with Reviewer 3 noting that this element of the proposal was very well written and sourced.

The project/program has identified a monitoring and data management strategy that will support project measures of success (Reviewers 1 and 2). Reviewer 2 notes that adaptive management is evidenced and metrics are well enunciated, and that public/scientific available information to verify/validate milestones has been included for items that allow that consideration (i.e. documenting WQ trends changes). Reviewer 3 does recommend including additional details in describing the program's data management plan, but it should be noted that detailed data management plans are not required at the proposal stage.

The proposal has sufficiently evaluated uncertainties and risks in achieving its objectives over time (all reviewers), as well as methods to mitigate these uncertainties and risks (Reviewer 1). Reviewer 3 notes that the cost-benefits of potentially increased human populations versus lower nutrient loading per person should be addressed. Reviewer 1 notes that the proposal clearly describes the case-by-case nature of water quality improvement projects. Reviewers 2 and 3 felt that the proposal should include more scientific information to support the evaluation of risks and uncertainties. Reviewer 3 points out that just one reference is provided in this discussion, and recommends evaluating the effectiveness of proposed activities as compared with alternative strategies (such as land purchases).

The proposal addresses long-term environmental risks including sea level rise and storm surge (all reviewers). However, some reviewers felt that more information was needed in this section. Relevant risks not mentioned in the proposal include: climate change (Reviewer 1), and risks associated with increased nutrient release into sensitive ecosystems as improved infrastructure in coastal areas allows higher human population densities (Reviewer 3). Reviewer 3 goes on to suggest that by adding a significant preservation component, this program could strike a balance between coastal preservation and infrastructure improvement.

The program considers some other applicable short-term risks and uncertainties (all reviewers), and approaches to evaluating and mitigating risks are detailed (Reviewers 2 and 3). However, Reviewer 1 notes that the potential socio-economic impacts of this program are not considered, and recommends discussing potential methods to ensure that disadvantaged communities have opportunities to be chosen as a project location.

All reviewers highlight MDEQ's demonstrated experience in implementing similar efforts in the past. The proposal has included relevant information on the significant experience and successes of the proposal sponsor in implementing Water Quality Projects across Mississippi, with emphasis in the Gulf Coast (Reviewer 2). However, Reviewer 1 recommends strengthening this discussion with a more robust evaluation of the past successes and failures of these efforts.

## **FPL 3b BAS Review Summary – Water Quality Improvement Program for Coastal Mississippi Waters**

**May 2020**

All reviewers agree that there is reasonable justification that the *Water Quality Improvement Program for Coastal Mississippi Waters* proposal is based on science that is pertinent to the Gulf Coast region and that maximizes the quality, objectivity, and integrity of information.

Reviewers 2 and 3 agree that the proposal is based on science that uses peer-reviewed and publicly available information. Numerous citations indicate an understanding of the systems being proposed (Reviewer 3), and various elements of the proposal are supported by their inclusion or alignment to federal, regional or local programs, or the use of information generated by these programs and/or existing peer-reviewed information (Reviewer 2). However, Reviewer 1 also recommends including more recent data and sources, especially for the septic failure rates, which have changed since the mid 90's.

**MDEQ Response:** MDEQ appreciates the comments made by the three external reviewers. MDEQ searched for recent data and sources, but during the proposal development process that type of data couldn't be found. An added section of septic failure rates since mid-90's has been added.

Reviewers generally felt that literature sources used to support the proposal were accurately and completely cited and represented in a fair and unbiased manner. Reviewer 2 points out that some citations were included in the Bibliography list, but were not included along the text, and that citations are needed to support the following elements of the proposal:

- Cite each of the multiple plans included under Priority Criteria Justification.
- The discussion of pollutant loading as identified environmental stressor.
- In the Environmental Benefits section, "Elevated levels of potentially harmful bacteria are one of several water quality problems that exist on the MS Gulf Coast"

**MDEQ Response:** Appropriate citations have been added.

While Reviewers 1 and 2 agreed that the scope of work provided in the proposal outlines clearly sourced methods, specific justification for these methods are not included (Reviewer 2).

Reviewer 3 suggests bolstering the description of methods with additional justification for method selection. The priority criteria justification section could also be strengthened by including a description of the current conditions of WQ and characteristics of the septic and wastewater systems in the project area (Reviewer 2).

**MDEQ Response:** Water quality improvement is a priority restoration activity identified by the coastal stakeholders of Mississippi. Beach advisories, beach closures, and elevated levels of bacterial and nutrient loads observed by various programs and projects point to water quality issues. Based on current sampling data and regulatory information, water quality continues to be an issue in coastal Mississippi waters. The details of respective methods, as described in the SOW, are site-specific and determined by several factors (climate, water level, soils, etc.) that influence the engineering designs on these case by case activities. The methods outlined in the SOW are the typical overarching methods and processes undertaken in the identification, selection, and repair of water quality issues, including specifically the Water Quality Improvement Program under Bucket 3 approved by the RESTORE Council.

Further clarification is recommended in discussing program goals and objectives (Reviewers 1 and 3). Reviewer 1 suggests including additional information about the scale of improvement that the program is hoping to achieve, along with overall targets, which could also assist with selecting projects. Reviewers 1 and 2 agreed that the metrics described in the proposal align with its goals and objectives. However, Reviewer 3 stated that “having a metric of compliance documents completed does not, in this reviewer’s opinion, constitute a metric of success. Rather it indicates effort to initiate needed processes.”

**MDEQ Response:** Comment Acknowledged. No additional clarification has been provided as the program goals and objectives match those provided and approved by the RESTORE Council in the Comprehensive Plan. The metrics selected represent the standard metrics MDEQ and other Council members have been using for infrastructure related implementation. No additional information has been added on scale of improvement, overall targets, etc., into the proposal as it is unknown at this stage given the nature of the program. However, the program’s overall target (and scale of improvement) would be to increase water quality and decrease contributions of bacteria, sediment, and nutrients to Mississippi coastal waters. Metric of “compliance documents completed” is a standard metric that the RESTORE Council utilizes for construction related projects.

The environmental benefits of the proposed program and the underlying environmental stressors are clearly identified (all reviewers), with Reviewer 3 noting that this element of the proposal was very well written and sourced.

**MDEQ Response:** Comment Acknowledged.

The project/program has identified a monitoring and data management strategy that will support project measures of success (Reviewers 1 and 2). Reviewer 2 notes that adaptive management is evidenced and metrics are well enunciated, and that public/scientific available information to verify/validate milestones has been included for items that allow that consideration (i.e. documenting WQ trends changes). Reviewer 3 does recommend including additional details in describing the program’s data management plan, but it should be noted that detailed data management plans are not required at the proposal stage.

**MDEQ Response:** Comment Acknowledged, no changes were made to the data management plan at this stage.

The proposal has sufficiently evaluated uncertainties and risks in achieving its objectives over time (all reviewers), as well as methods to mitigate these uncertainties and risks (Reviewer 1). Reviewer 3 notes that the cost-benefits of potentially increased human populations versus lower nutrient loading per person should be addressed. Reviewer 1 notes that the proposal clearly describes the case-by-case nature of water quality improvement projects. Reviewers 2 and 3 felt that the proposal should include more scientific information to support the evaluation of risks and uncertainties. Reviewer 3 points out that just one reference is provided in this discussion, and recommends evaluating the effectiveness of proposed activities as compared with alternative strategies (such as land purchases).

**MDEQ Response:** Comment Acknowledged. Land acquisition for coastal preservation is not a part of this proposal and alternative analyses are not needed. Other coastal restoration funding is being used for land acquisition that has multiple benefits for coastal Mississippi including water quality benefits.

The proposal addresses long-term environmental risks including sea level rise and storm surge (all reviewers). However, some reviewers felt that more information was needed in this section. Relevant risks not mentioned in the proposal include: climate change (Reviewer 1), and risks associated with increased nutrient release into sensitive ecosystems as improved infrastructure in coastal areas allows higher human population densities (Reviewer 3). Reviewer 3 goes on to suggest that by adding a significant preservation component, this program could strike a balance between coastal preservation and infrastructure improvement.

**MDEQ Response:** Comment Acknowledged. Land acquisition for coastal preservation is not a part of this proposal. Climate change risk is addressed through sea level rise and storm surge, two variables that are related to climate change. The primary objective of this water quality improvement program is not providing improved infrastructure in low-density areas to support future development, rather it is identifying existing problems and providing water quality improvement solutions.

The program considers some other applicable short-term risks and uncertainties (all reviewers), and approaches to evaluating and mitigating risks are detailed (Reviewers 2 and 3). However, Reviewer 1 notes that the potential socio-economic impacts of this program are not considered, and recommends discussing potential methods to ensure that disadvantaged communities have opportunities to be chosen as a project location.

**MDEQ Response:** Water quality improvement location selection will be driven by Best Available Science (e.g., biological sampling), known/identified water quality issues, and system failures, which could include disadvantaged communities' locations depending on the outcome of the BAS.

All reviewers highlight MDEQ's demonstrated experience in implementing similar efforts in the past. The proposal has included relevant information on the significant experience and successes of the proposal sponsor in implementing Water Quality Projects across Mississippi, with emphasis in the Gulf Coast (Reviewer 2). However, Reviewer 1 recommends strengthening this discussion with a more robust evaluation of the past successes and failures of these efforts.

**MDEQ Response:** Comment Acknowledged. It is currently too early in the process to evaluate successes and failures for implementation activities related to MDEQ's ongoing DWH water quality improvement efforts (e.g. Direct Component and Spill Impact Component).

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## **Gulf Coast Ecosystem Restoration Council**

### **FPL 3b Internal Best Available Science Review Panel Summary**

**July 2020**

#### **Introduction**

On Tuesday, June 30, and Wednesday July 1, 2020 the RESTORE Council convened the Funded Priorities List (FPL) 3b Internal Best Available Science (BAS) Review Panel. The purpose of this internal panel was to use Council member-agency expertise to address external BAS review comments provided for FPL 3b submitted project/program proposals, and potentially identify project/program synergies not identified prior to proposal submission. The ultimate goal of the panel was to provide Council members with substantive best available science content to inform their decision-making.

The internal panel was convened via webinar with representatives from each of the Council's eleven member agencies present. Each BAS Panel member was provided the following:

- 1) Full FPL 3b proposals
- 2) 3 external BAS reviews for each proposal
- 3) Summary of external BAS reviews for each proposal
- 4) Proposal Sponsor's response to the BAS reviews summary
- 5) Any proposed revisions to the proposal

Proposal sponsors provided a brief synopsis of their proposal to the panel, a summary of comments made in external reviews, and discussed their proposed response to the external reviews. Council staff then solicited feedback from the panel on the proposal sponsor's presentation of comments and responses to those comments, and any additional BAS concerns. Council staff also solicited feedback on any existing or future synergies with other Gulf restoration activities. The proceedings of the meeting for this proposal are summarized below.

#### **Water Quality Improvement Program for Coastal Mississippi Waters**

**Feedback from the panel on the proposal sponsor's presentation of comments and responses to those comments, and any additional BAS concerns:**

*Citations:* Include more recent data and sources.

- The BAS panel agrees that Mississippi has appropriately addressed this comment.

*Methodological details:* Include more details on method selection.

- The BAS panel agrees that Mississippi has appropriately addressed this comment.

*Goals and objectives:* Include more details on goals and objectives.

- The BAS panel agrees that Mississippi has appropriately addressed this comment.

*Monitoring and adaptive management:* Include more details on adaptive management.

- The BAS panel agrees that Mississippi has appropriately addressed this comment.

*Data management:* Include more details on data management strategy.

- The BAS panel agrees that Mississippi has appropriately addressed this comment.

*Techniques:* Include land acquisition as a method for water quality improvement.

- The BAS panel agrees that Mississippi has appropriately addressed this comment.

*Other:* Mississippi indicates their desire for the proposed water quality improvement program to use metrics and parameters that are consistent with those used by other RESTORE-funded water quality programs across the Gulf.

- All panelists with such proposals concur.
- Council Staff note that the Mississippi BAS responses for this proposal regarding metrics do not capture the revisions to the proposal that have been made to include the additional project-level water quality metrics.
- Mississippi response: Mississippi has revised BAS responses to be consistent with proposal revisions.

**Panel comments on existing or future synergies with proposed activity:**

Mississippi, Florida, Alabama, and Texas agree that synergies can be fostered between the proposed water quality improvement programs across these states, such as by adopting shared metrics, measures, and monitoring methodologies.



# SCIENCE EVALUATION

Bucket 2: Comprehensive Plan Component

|   |
|---|
| <b>Proposal Title:</b> Water Quality Improvement Program for Coastal Mississippi Waters |
| <b>Location (If Applicable):</b> Gulf-wide  |
| <b>Council Member Bureau or Agency:</b> Mississippi Department of Environmental Quality |
| <b>Type of Funding Requested:</b> Planning / Implementation                             |

|                                   |
|-----------------------------------|
| <b>Reviewed by:</b> Reviewer 1    |
| <b>Date of Review:</b> 05/09/2020 |

## Best Available Science:

*These 4 factors/elements help frame the reviewer's answers to A, B and C found in next section:*

|  |                       |
|--|-----------------------|
| <b>Question 1.</b>   |                       |
| Have the proposal objectives, including proposed methods, been justified using peer reviewed and/or publicly available information?  | Need more information |
| <b>Comments:</b>   |                       |
| In general yes, however, the proposal uses a number of sources from the 1990's and even the 1980's. I recommend revisiting the literature review to find more recent data and sources, especially for the septic failure rates, which have certainly changed since the mid 90's. |                       |

|   |     |
|---|-----|
| <b>Question 2.</b>  |     |
| If information supporting the proposal does not directly pertain to the Gulf Coast region, are the proposal's methods reasonably supported and adaptable to that geographic area? | Yes |
| <b>Comments:</b>  |     |
| The proposal's information directly pertains to the Gulf Coast region.  |     |

|  |                       |
|--|-----------------------|
| <b>Question 3.</b>   |                       |
| Are the literature sources used to support the proposal accurately and completely cited? Are the literature sources represented in a fair and unbiased manner? | Need more information |
| <b>Comments:</b>   |                       |
| In general yes. Again, I would recommend revising some of the sources used to ensure up-to-date and relevant information.                                      |                       |

|   |     |
|---|-----|
| <b>Question 4.</b>  |     |
| Does the proposal evaluate uncertainties and risks in achieving its objectives over time? (e.g., is there an uncertainty or risk in the near- and/or long-term that the project/program will be obsolete or not function as planned?) | Yes |
| <b>Comments:</b>  |     |
| The proposal does a good job of identifying uncertainties such as which intervention is needed in each case. The proposal also outlines methods to mitigate these uncertainties and risks.  |     |

Based on the answers to the previous 4 questions, and *giving deference to the sponsor to provide within reason the use of best available science*, the following three questions can be answered:

|  |                       |
|--|-----------------------|
| <b>Question A</b>  |                       |
| Has the applicant provided reasonable justification that the proposal is based on science that uses peer- reviewed and publicly available data?  | Need more information |
| <b>Comments:</b>   |                       |
| Yes though some of the data seems outdated. Specifically the rates of septic system failure. I recommend a second pass through the literature to find sources from within the last 5-10 years. |                       |

|  |     |
|--|-----|
| <b>Question B</b>  |     |
| Has the applicant provided reasonable justification that the proposal is based on science that maximizes the quality, objectivity, and integrity of information (including, as applicable, statistical information)? | Yes |
| <b>Comments:</b>   |     |
| Overall yes. The proposal is based on well-researched and regularly implemented science around water quality improvement.  |     |

|  |     |
|--|-----|
| <b>Question C</b>  |     |
| Has the applicant provided reasonable justification that the proposal is based on science that clearly documents and communicates risks and uncertainties in the scientific basis for such projects/programs?                                | Yes |
| <b>Comments:</b>   |     |
| The proposal shows a clear understanding of the case-by-case nature of water quality improvement projects. The type of intervention, the use of multiple interventions, and how extensive those efforts are all depend upon project context. |     |

## Science Context Evaluation:

|  |     |
|--|-----|
| <b>Question A</b>  |     |
| Has the project/program sponsor or project partners demonstrated experience in implementing a project/program similar to the one being proposed? | Yes |
| <b>Comments:</b>   |     |
| The MDEQ has run similar efforts in the past.  |     |

|  |                       |
|--|-----------------------|
| <b>Question B</b>  |                       |
| Does the project/program have clearly defined goals objectives?  | Need more information |
| <b>Comments:</b>   |                       |
| Yes though the objectives lack overall targets that the program as a whole is attempting to reach. Improvement in water quality is a great goal, but what is the scale of improvement that the program is hoping to achieve. Setting these targets will also assist with selecting projects. |                       |

|   |     |
|---|-----|
| <b>Question C</b>   |     |
| Has the proposal provided a clear description of the methods proposed, and appropriate justification for why the method is being selected (e.g., scientifically sound; cost-effectiveness)? | Yes |
| <b>Comments:</b>  |     |
| The proposal outlines clearly sourced methods that are well researched.   |     |

|  |     |
|--|-----|
| <b>Question D</b>  |     |
| Does the project/program identify the likely environmental benefits of the proposed activity? Where applicable, does the application discuss those benefits in reference to one or more underlying environmental stressors identified by best available science and/or regional plans? | Yes |
| <b>Comments:</b>   |     |
| The environmental benefits of the interventions and the underlying environmental stressors are clearly identified.   |     |

|   |     |
|---|-----|
| <b>Question E</b>   |     |
| Does the project/program have measures of success (i.e., metrics) that align with the primary Comprehensive Plan goal(s)/objectives? (Captures the statistical information requirement as defined by RESTORE Act) | Yes |
| <b>Comments:</b>  |     |
| The proposal has clear programmatic metrics though as I mentioned above, I recommend setting overarching water quality improvement targets.   |     |

|   |                       |
|---|-----------------------|
| <b>Question F</b>   |                       |
| Does the proposal discuss the project/program's vulnerability to potential long-term environmental risks (i.e., climate, pollution, changing land use)? (Captures risk measures as defined under best available science by the RESTORE Act)   | Need more information |
| <b>Comments:</b>  |                       |
| The proposal discusses multiple long-term environmental risks including sea level rise and storm surges. Climate change is not discussed though which I do view as an oversight as climate change will result in changes to precipitation patterns throughout the Mississippi River Basin which in turn will change flowrates and sediment/nutrient loading in the Mississippi River. This will have a direct impact on MDEQ's water quality efforts. |                       |

| <b>Question G</b>   |                       |
|---|-----------------------|
| Does the project/program consider other applicable short-term implementation risks and scientific uncertainties? Such risks may include the potential for unanticipated adverse environmental and/or socio-economic impacts from project implementation. Is there a mitigation plan in place to address these risks? Any relevant scientific uncertainties and/or data gaps should also be discussed. (Captures risk measures as defined under best available science by the RESTORE Act) | Need more information |
| <b>Comments:</b>  |                       |
| Some short-term risks are discussed such as type of intervention to be used and the efficacy of any intervention in a specific context. However, the potential socio-economic impacts of this program are not considered. Is there a method to ensure that disadvantaged communities have opportunities to be chosen as a project location? If not, the funding could go disproportionately to certain demographics over others.  |                       |

| <b>Question H</b>   |                       |
|---|-----------------------|
| Does the project/program consider recent and/or relevant information in discussing the elements above?  | Need more information |
| <b>Comments:</b>  |                       |
| Some of the data quoted in the proposal is quite out-dated. I recommend looking for more recent data and sources to update a few aspects of the proposal. |                       |

| <b>Question I</b>   |                       |
|---|-----------------------|
| Has the project/program evaluated past successes and failures of similar efforts? (Captures the communication of risks and uncertainties in the scientific basis for such projects as defined by the RESTORE Act) | Need more information |
| <b>Comments:</b>  |                       |
| Other MDEQ efforts are mentioned, however the proposal does not actively evaluate the success or failures of those efforts.   |                       |



|  |     |
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| <b>Question J</b>  |     |
| Has the project/program identified a monitoring and data management strategy that will support project measures of success (i.e., metrics). If so, is appropriate best available science justification provided? If applicable, how is adaptive management informed by the performance criteria? (Captures statistical information requirement a defined by the RESTORE Act) | Yes |
| <b>Comments:</b>   |     |
| The proposal outlines a monitoring and data management strategy that will be effective.  |     |



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| <b>Please summarize any additional information needed below:</b> |
| <a href="#">Click here to enter text.</a>                        |



# SCIENCE EVALUATION

Bucket 2: Comprehensive Plan Component

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|---|
| <b>Proposal Title:</b> Water Quality Improvement Program for Coastal Mississippi Waters |
| <b>Location (If Applicable):</b> Gulf-wide  |
| <b>Council Member Bureau or Agency:</b> Mississippi Department of Environmental Quality |
| <b>Type of Funding Requested:</b> Planning / Implementation                             |

|                                    |
|------------------------------------|
| <b>Reviewed by:</b> Reviewer 2     |
| <b>Date of Review:</b> May 9, 2020 |

## Best Available Science:

*These 4 factors/elements help frame the reviewer's answers to A, B and C found in next section:*

|   |     |
|---|-----|
| <b>Question 1.</b>  |     |
| Have the proposal objectives, including proposed methods, been justified using peer reviewed and/or publicly available information?   | Yes |
| <b>Comments:</b>  |     |
| The Water Quality Improvement Program (WQIP) will support the restoration of water quality (WQ) of MS's coastal water resources through identification and implementation of WQ improvement projects. Activities of the WQIP are consistent with the RESTORE Council primary objective and addresses commitments set forth in the 2016 Comprehensive Plan Update. Project's Scope of Work proposed to be conducted in accordance with scientific procedures, applicable engineering, design guidelines and standards, and Federal QA/QC guidelines. |     |

|   |     |
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| <b>Question 2.</b>  |     |
| If information supporting the proposal does not directly pertain to the Gulf Coast region, are the proposal's methods reasonably supported and adaptable to that geographic area? | Yes |
| <b>Comments:</b>  |     |
| Information supporting proposal includes results/observations from regional or national studies or guidelines, reasonably adaptable to the Mississippi's Gulf Coast area.         |     |

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| <b>Question 3.</b>   |                       |
| Are the literature sources used to support the proposal accurately and completely cited? Are the literature sources represented in a fair and unbiased manner?   | Need more information |
| <b>Comments:</b>   |                       |
| In general terms sources are accurate and well cited. A citation is needed for each one of the multiple plans included along the Priority Criteria Justification . Since these are critical/relevant statements supporting the proposal, the citation of these elements becomes relevant. Also a citation along the discussion of pollutant loading as identified environmental stressor is important. Similarly, in the Environmental Benefits section for the statement "Elevated levels of potentially harmful bacteria are one of several water quality problems that exist on the MS Gulf Coast", which is relevant and transcendental in the following discussion. |                       |

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| <b>Question 4.</b>  |     |
| Does the proposal evaluate uncertainties and risks in achieving its objectives over time? (e.g., is there an uncertainty or risk in the near- and/or long-term that the project/program will be obsolete or not function as planned?)   | Yes |
| <b>Comments:</b>  |     |
| The proposal evaluates uncertainties associated to inadequate planning to achieve desired WQ improvements as a result of the repair, upgrade and/o construction implemented; the determination of the exact WQ improvement practice needed to be implemented for a specific project; and uncertainties associated to variable costs for implementation. |     |

Based on the answers to the previous 4 questions, and *giving deference to the sponsor to provide within reason the use of best available science*, the following three questions can be answered:

|   |     |
|---|-----|
| <b>Question A</b>   |     |
| Has the applicant provided reasonable justification that the proposal is based on science that uses peer- reviewed and publicly available data?   | Yes |
| <b>Comments:</b>  |     |
| The different elements of the proposal are supported by their inclusion or alignment to federal, regional or local programs, or the use of information generated by these programs or existing peer-reviewed information. |     |

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| <b>Question B</b>  |     |
| Has the applicant provided reasonable justification that the proposal is based on science that maximizes the quality, objectivity, and integrity of information (including, as applicable, statistical information)?                         | Yes |
| <b>Comments:</b>   |     |
| Proposal is supported on aligning its content and committing its tasks to specific components from different federal, state and regional plans/programs, which have been developed integrating rigorous scientific analysis and assessments. |     |

|   |                       |
|---|-----------------------|
| <b>Question C</b>   |                       |
| Has the applicant provided reasonable justification that the proposal is based on science that clearly documents and communicates risks and uncertainties in the scientific basis for such projects/programs? | Need more information |
| <b>Comments:</b>  |                       |

It could be better presented in the proposal

### Science Context Evaluation:

| Question A  |     |
|---|-----|
| Has the project/program sponsor or project partners demonstrated experience in implementing a project/program similar to the one being proposed?  | Yes |
| <b>Comments:</b>  |     |
| The agency enunciated that has significant experience in implementing WQ improvement projects across MS, with particular emphasis in the Gulf Coast. The agency listed projects already executed and activities/projects associated to proposed project tasks for an approximated amount of \$673.1 millions. |     |

| Question B  |     |
|---|-----|
| Does the project/program have clearly defined goals objectives?   | Yes |
| <b>Comments:</b>  |     |
| The main goal and objective of the project and five specific objectives set to improve WQ entering the Mississippi Sound and coastal waters were well defined in te proposal. |     |

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| <b>Question C</b>   |     |
| Has the proposal provided a clear description of the methods proposed, and appropriate justification for why the method is being selected (e.g., scientifically sound; cost-effectiveness)?   | Yes |
| <b>Comments:</b>  |     |
| <p>The proposal presents a Scope of Work, which includes four well defined and described tasks that could run concurrently, and could be coordinated with other WQ improvement efforts.</p> <p>Specific justification of the use of the methods is not included, but some of the tasks are associated to the agency's normal operations or ruled operations, and others are referenced to specific decisions/approval taken in coordination with communities, city government or the RESTORE Council.</p> |     |

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| <b>Question D</b>  |     |
| Does the project/program identify the likely environmental benefits of the proposed activity? Where applicable, does the application discuss those benefits in reference to one or more underlying environmental stressors identified by best available science and/or regional plans? | Yes |
| <b>Comments:</b>   |     |
| <p>Supported on technical/scientific facts and available information, environmental benefits of improving/changing the wastewater systems, and consequently, improving WQ in the Gulf coast is properly described in the proposal.</p>   |     |

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| <b>Question E</b>   |     |
| Does the project/program have measures of success (i.e., metrics) that align with the primary Comprehensive Plan goal(s)/objectives? (Captures the statistical information requirement as defined by RESTORE Act) | Yes |
| <b>Comments:</b>  |     |
| <p>Three metrics were proposed including a brief statement of the elements to be used as measure of success for the project.</p>  |     |

| <b>Question F</b>  |     |
|--|-----|
| Does the proposal discuss the project/program's vulnerability to potential long-term environmental risks (i.e., climate, pollution, changing land use)? (Captures risk measures as defined under best available science by the RESTORE Act)  | Yes |
| <b>Comments:</b>   |     |
| <p>Uncertainties and risk of not improving WQ moving into MS Sound are proposed to be decreased with diligent and effective planning prior to implementation and post construction monitoring.</p> <ul style="list-style-type: none"> <li>- Sea level rise is expected not be a factor affecting implementation of sewer and wastewater. Scientific support was described in which MS coastal wastewater treatment facilities have low risk for sea level rise.</li> <li>- Upgrades could be based on storm surge predictions to avoid failure of systems under these conditions.</li> </ul> |     |

| <b>Question G</b>   |     |
|---|-----|
| Does the project/program consider other applicable short-term implementation risks and scientific uncertainties? Such risks may include the potential for unanticipated adverse environmental and/or socio-economic impacts from project implementation. Is there a mitigation plan in place to address these risks? Any relevant scientific uncertainties and/or data gaps should also be discussed. (Captures risk measures as defined under best available science by the RESTORE Act) | Yes |
| <b>Comments:</b>  |     |
| <p>The risk of implementing BMPs for WQ improvement in riparian and in stream areas, possibly causing flooding and drainage issues to upstream urban areas, will be evaluated through specific engineering and design of wastewater/stormwater improvement practices, for these practices to influence and control water flow and to ensure design maximizes WQ mitigation</p>  |     |

| <b>Question H</b>  |     |
|--|-----|
| Does the project/program consider recent and/or relevant information in discussing the elements above?   | Yes |
| <b>Comments:</b>   |     |
| <p>Relevant, sufficient and updated information, and probably from compiled experience of executed projects by the same agency, was considered in description of project goals, scope of work, environmental benefits and uncertainties and risks for the project. Some of the information could be better detailed/cited (as commented before in Question 3), but does not impact on proper delivery of project information delivery.</p> |     |

|   |     |
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| <b>Question I</b>   |     |
| Has the project/program evaluated past successes and failures of similar efforts? (Captures the communication of risks and uncertainties in the scientific basis for such projects as defined by the RESTORE Act)         | Yes |
| <b>Comments:</b>  |     |
| Based on the significant experience in implementing WQ improvement projects across MS with special emphasis along the Gulf Coast, the agency identified some uncertainties and risks for consideration for this proposal. |     |

|   |     |
|---|-----|
| <b>Question J</b>   |     |
| Has the project/program identified a monitoring and data management strategy that will support project measures of success (i.e., metrics). If so, is appropriate best available science justification provided? If applicable, how is adaptive management informed by the performance criteria? (Captures statistical information requirement a defined by the RESTORE Act)  | Yes |
| <b>Comments:</b>  |     |
| Monitoring and Adaptive Management and a Data Management strategy are well detailed and properly described in the proposal. Different metrics are well enunciated. Use of public/scientific available information to verify/validate milestones is included for items that allow that consideration (i.e. documenting WQ trends changes). Adaptive management is evidenced in the definition of items calling to readjust monitoring and evaluation criteria according to individual implementation/restoration projects, and by advancing additional vetting of project implementation success and identification of additional problem areas, when no progress towards specific outcomes is observed. |     |



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| <b>Please summarize any additional information needed below:</b> |
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Along the Priority Criteria Justification, a description of the current “State of the Art”, regarding the conditions of WQ and characteristics of the septic and wastewater systems in the project area would make this section of the proposal stronger.

Some citations were included in the Bibliography list, but were not included along the text.



# SCIENCE EVALUATION

Bucket 2: Comprehensive Plan Component

|   |
|---|
| <b>Proposal Title:</b> Water Quality Improvement Program for Coastal Mississippi Waters |
| <b>Location (If Applicable):</b> Gulf-wide  |
| <b>Council Member Bureau or Agency:</b> Mississippi Department of Environmental Quality |
| <b>Type of Funding Requested:</b> Planning / Implementation                             |

|                                     |
|-------------------------------------|
| <b>Reviewed by:</b> Reviewer 3      |
| <b>Date of Review:</b> 5-7 May 2020 |

## Best Available Science:

*These 4 factors/elements help frame the reviewer's answers to A, B and C found in next section:*

|   |     |
|---|-----|
| <b>Question 1.</b>  |     |
| Have the proposal objectives, including proposed methods, been justified using peer reviewed and/or publicly available information? | Yes |
| <b>Comments:</b>  |     |
| The contents of this proposal are well supported with literature.   |     |

|   |     |
|---|-----|
| <b>Question 2.</b>  |     |
| If information supporting the proposal does not directly pertain to the Gulf Coast region, are the proposal's methods reasonably supported and adaptable to that geographic area? | Yes |
| <b>Comments:</b>  |     |
| No applicable to this proposal as the areas involved are on Gulf Coast.   |     |

|  |     |
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| <b>Question 3.</b>   |     |
| Are the literature sources used to support the proposal accurately and completely cited? Are the literature sources represented in a fair and unbiased manner? | Yes |
| <b>Comments:</b>   |     |
| <a href="#">Click here to enter text.</a>  |     |

|   |     |
|---|-----|
| <b>Question 4.</b>  |     |
| Does the proposal evaluate uncertainties and risks in achieving its objectives over time? (e.g., is there an uncertainty or risk in the near- and/or long-term that the project/program will be obsolete or not function as planned?) | Yes |
| <b>Comments:</b>  |     |
| <a href="#">Click here to enter text.</a>   |     |

Based on the answers to the previous 4 questions, and *giving deference to the sponsor to provide within reason the use of best available science*, the following three questions can be answered:

|  |     |
|--|-----|
| <b>Question A</b>  |     |
| Has the applicant provided reasonable justification that the proposal is based on science that uses peer- reviewed and publicly available data?  | Yes |
| <b>Comments:</b>   |     |
| There are numerous citations that incicate an understanding of the systems being proposed. Attention to the cost-benefits of potentially increased human populations versus lower nutrient loading per person should be addressed. Increasing sewage treatment capacity could increase human population densities in coastal areas therby increasing stormwater runoff and nutrient influx into coastal areas, just as easily as it could lower nutrient influences from existing residences and businesses. |     |

|   |     |
|---|-----|
| <b>Question B</b>   |     |
| Has the applicant provided reasonable justification that the proposal is based on science that maximizes the quality, objectivity, and integrity of information (including, as applicable, statistical information)?  | Yes |
| <b>Comments:</b>  |     |
| It should be mentioned that this is a difficult question to answer for this type of overarching proposal to distribute funds for individual projects. Those projects are most likely to be the ones to justify their approaches with the type of literature requested here. |     |

|   |                       |
|---|-----------------------|
| <b>Question C</b>   |                       |
| Has the applicant provided reasonable justification that the proposal is based on science that clearly documents and communicates risks and uncertainties in the scientific basis for such projects/programs?   | Need more information |
| <b>Comments:</b>  |                       |
| One reference is provided and perhaps more could be done to demonstrate understanding of risks and uncertainties. Additionally, to minimize human ipopulation density in sensitive ecosystems, properly functioning septic systems with appropriately sized drainage areas, (several acres for each dwelling), would be more effective at long term nutrient and bacteria management than would placing many more dwellings on a unified sewer system. This would mean requiring lot sizes or buffer zones of |                       |

several acres to minimize nutrient loads. Thus land purchases could be more effective a management strategy.

### Science Context Evaluation:

|  |     |
|--|-----|
| <b>Question A</b>  |     |
| Has the project/program sponsor or project partners demonstrated experience in implementing a project/program similar to the one being proposed? | Yes |
| <b>Comments:</b>   |     |
| The applicant has significant experience with the type of infrastructure projects being proposed.  |     |

|   |                       |
|---|-----------------------|
| <b>Question B</b>   |                       |
| Does the project/program have clearly defined goals objectives?   | Need more information |
| <b>Comments:</b>  |                       |
| The Stated Goal is it improve water quality in Mississippi coastal beachfronts by reducing and treating nutrient and pollutant loading. This seems vague. |                       |

|                   |
|-------------------|
| <b>Question C</b> |
|-------------------|

|   |                       |
|---|-----------------------|
| Has the proposal provided a clear description of the methods proposed, and appropriate justification for why the method is being selected (e.g., scientifically sound; cost-effectiveness)?   | Need more information |
| <b>Comments:</b>  |                       |
| Methods are provided, but justification for selection is not well justified. I do not intend to suggest that the methods are incorrect, rather that the justification is not really provided. There is some justification in the sections related to Question-D, so the rating was NMI rather than NO, for this question. Further, limiting the scope of targeted approaches to waste and storm water infrastructure seems overly limiting. The RESTORE Council will have a much better perspective on whether this approach is too restrictive in the proposed region of the Gulf. For example, if increases in and protection of riparian areas is being considered for storm water mitigation that would be excellent, but there is no indication of what stormwater management would entail within the context of this proposal. The budget justification seems to indicate that all projects are construction not direct habitat improvement/protection. |                       |

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| <b>Question D</b>  |     |
| Does the project/program identify the likely environmental benefits of the proposed activity? Where applicable, does the application discuss those benefits in reference to one or more underlying environmental stressors identified by best available science and/or regional plans? | Yes |
| <b>Comments:</b>   |     |
| This aspect is very well written and sourced. Some of the text and references here address Q-C.  |     |

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|---|-----------------------|
| <b>Question E</b>   |                       |
| Does the project/program have measures of success (i.e., metrics) that align with the primary Comprehensive Plan goal(s)/objectives? (Captures the statistical information requirement as defined by RESTORE Act)   | Need more information |
| <b>Comments:</b>  |                       |
| The metrics are consistent with the objectives, but the metrics are quite vague. Having a metric of compliance documents completed does not, in this reviewer's opinion, constitute a metric of success. Rather it indicates effort to initiate needed processes. |                       |

| <b>Question F</b>  |                       |
|--|-----------------------|
| Does the proposal discuss the project/program's vulnerability to potential long-term environmental risks (i.e., climate, pollution, changing land use)? (Captures risk measures as defined under best available science by the RESTORE Act)  | Need more information |
| <b>Comments:</b>   |                       |
| This section seems to evaluate risks and uncertainties from sea level rise and storm surges in the long term. The risk of increasing nutrient release into sensitive ecosystems as improved infrastructure in coastal areas allows higher human population densities is not addressed. |                       |

| <b>Question G</b>   |     |
|---|-----|
| Does the project/program consider other applicable short-term implementation risks and scientific uncertainties? Such risks may include the potential for unanticipated adverse environmental and/or socio-economic impacts from project implementation. Is there a mitigation plan in place to address these risks? Any relevant scientific uncertainties and/or data gaps should also be discussed. (Captures risk measures as defined under best available science by the RESTORE Act) | Yes |
| <b>Comments:</b>  |     |
| Project management and implementation risks are addressed and the need for proper management is detailed.   |     |

| <b>Question H</b>  |     |
|--|-----|
| Does the project/program consider recent and/or relevant information in discussing the elements above? | Yes |
| <b>Comments:</b>   |     |
| Many pertinent, current sources of information are provided in the proposal.                           |     |

|   |     |
|---|-----|
| <b>Question I</b>   |     |
| Has the project/program evaluated past successes and failures of similar efforts? (Captures the communication of risks and uncertainties in the scientific basis for such projects as defined by the RESTORE Act) | Yes |
| <b>Comments:</b>  |     |
| The applicant addresses significant successes in the area of improved wastewater infrastructure.  |     |

|  |                       |
|--|-----------------------|
| <b>Question J</b>  |                       |
| Has the project/program identified a monitoring and data management strategy that will support project measures of success (i.e., metrics). If so, is appropriate best available science justification provided? If applicable, how is adaptive management informed by the performance criteria? (Captures statistical information requirement a defined by the RESTORE Act) | Need more information |
| <b>Comments:</b>   |                       |
| The applicant has identified a data management plan, but htat plan has little detail and more specifics are needed to provide confidence in the suitability of that plan.  |                       |



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| <b>Please summarize any additional information needed below:</b> |
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By adding a significant preservation component, this program could strike a balance between coastal preservation and infrastructure improvement. That would be a very valuable contribution to improvement of coastal ecosystem health. The risk is that infrastructure improvements will simply attract more human residents to coastal areas of Mississippi, and thereby have neutral if not adverse effects on coastal ecosystem health.